GAS JOURNAL

LIGHT . HEAT . POWER . BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. 203. 85th Year. LONDON, AUGUST 30, 1933. No. 3667. Price 1s.

Gas Cleaning by ELECTRICAL PRECIPITATION

Recent orders completed or under construction

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COKE OVEN GAS: The Nunnery Colliery Co., Ltd. 8 million cub. ft. per day.

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All plants incorporate English Electric Co.'s High Tension Direct Current Generators.

Two new items of equipment produced by the Whessoe Company for the Gas and Coke Oven Industries:—

The W.W-D Electro Detarrer
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The success of these processes of electrical precipitation is indicated by the orders received. These notable additions to the range of Whessoe gas treating plant, feature high efficiency, a special insulator system and an unique system of generation of H.T. Direct Current.

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INSULATING BRICKS — RECUPERATOR TUBES

Special semi-silica quality for Segmental Retorts with no Expansion or Contraction at 1400° C.

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LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in progress for early delivery.

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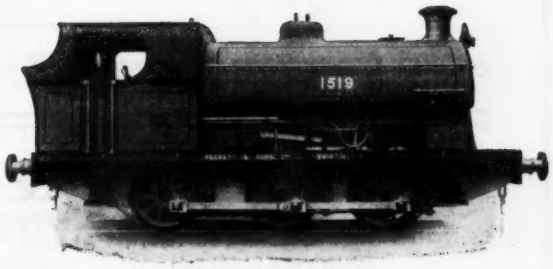

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We specialise in

COKE — BREAKING, ELEVATING, and SCREENING PLANT

Embodying over 40 years' Experience, Waller's NEW MODEL BREAKER is of robust construction, produces a minimum of breeze dust, and ensures low maintenance cost. An extra Heavy Model is supplied for breaking FURNACE COKE.

Portable Breaking and Screening Plants.

Small Plants for small works.

COKE — WASHING PLANT

("Retriever" Patents)

Producing clean washed Nuts.

Simple—efficient—very little water required.

In conjunction with the above,

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for abstracting the moisture from Washed Coke, and eliminating all dust.

Waste Heat used where available.

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A paying proposition.

Recovering from 35 °/₀ to 45 °/₀ good clean Fuel from Waste Material.

SEND US YOUR ENQUIRIES ***WRITE FOR OUR CATALOGUES***

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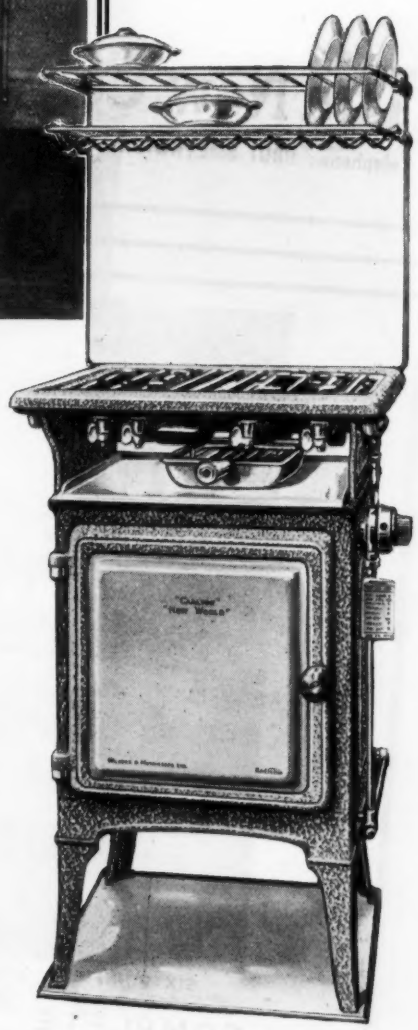
'CARLTON' 'NEW WORLD'

Cookers—
Series
Two

for better business



"STILL better and better still" is the Wilson motto and the new series of the "Carlton" "New World" Cookers is bringing compliments by the score. The Wilson individuality of workmanship is seen to advantage and with the standard "New World" features of "Regulo" automatic oven-heat control, single oven burner and direct bottom-flue-outlet, makes this series a sales-bringer that meets every possible modern requirement. The new Wilson illustrated price list is now available and may be obtained on application.

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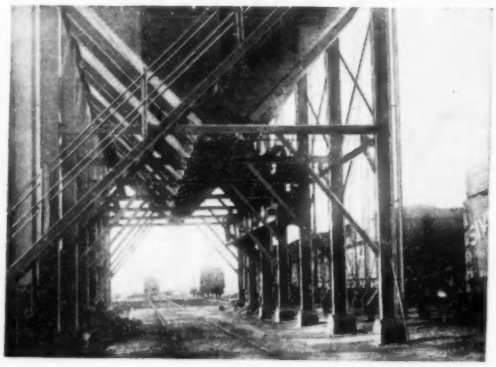
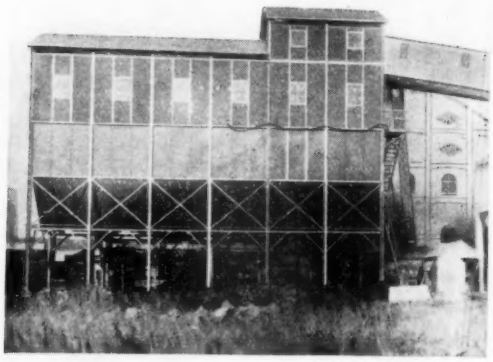
(Radiation Ltd., Proprietors.)

MODERN COKE SCREENING AND GRADING PLANTS



All plants designed to include modern up-to-date units.

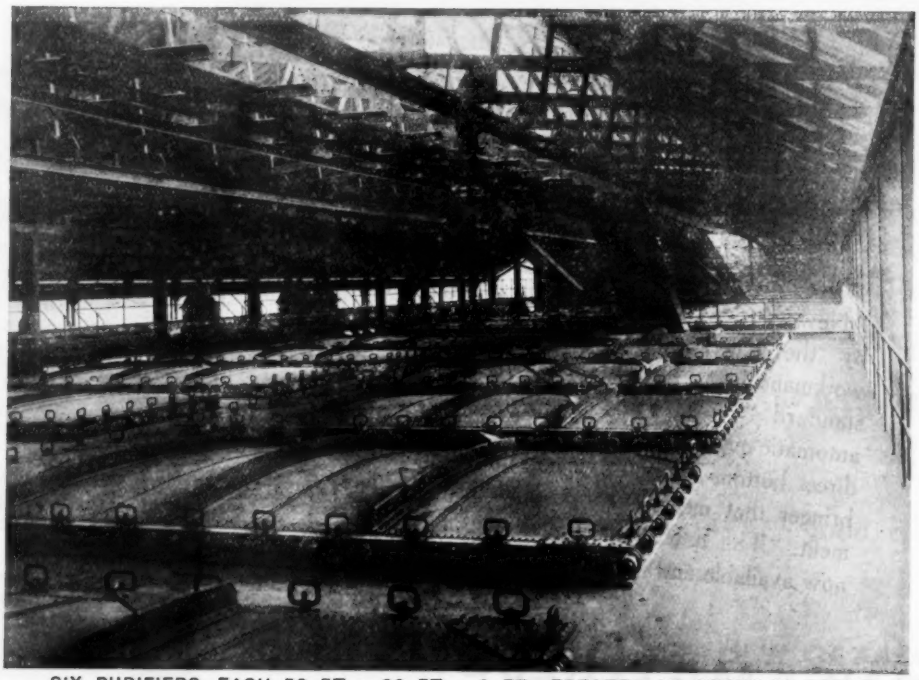


Our Technical Staff is at your service to prepare designs to suit local conditions.

Your enquiries are invited.

The New Conveyor Co., Ltd., Smethwick

Telephone: 0801 SMETHWICK — Near Birmingham — Telegrams: "APTITUDE, BIRMINGHAM."



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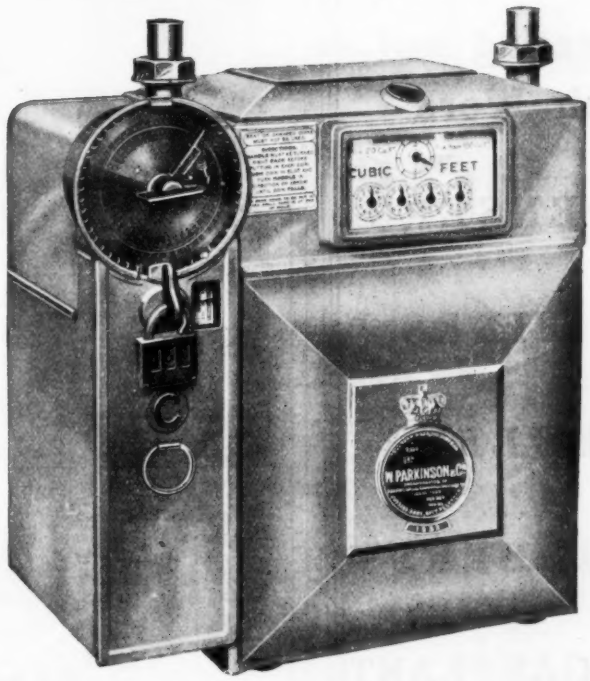
TWO-COIN OPTIONAL METER

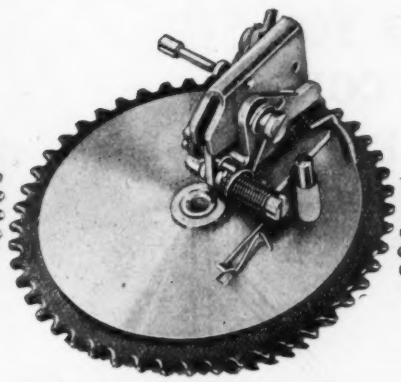
ONE SLOT

Penny or Shilling or Both



NOTE THE SIMPLE METHOD OF CONVERTING

Peg in Optional position for use with either penny or shilling.



To convert for use with shillings only, remove peg and insert in same hole but from opposite side.

To convert for use with pennies only, remove peg and insert in steel cam below coin pocket.

W. PARKINSON & CO.

INCORPORATED IN PARKINSON & COWAN (GAS METERS) LTD.

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SPIRAL: STANDARD GUIDED: WATERLESS (Klonne Patent)

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WATER-GAS PLANT

PRODUCERS FOR GASIFYING COKE BREEZE

(Fitted with the Koller Patent Revolving Grate)

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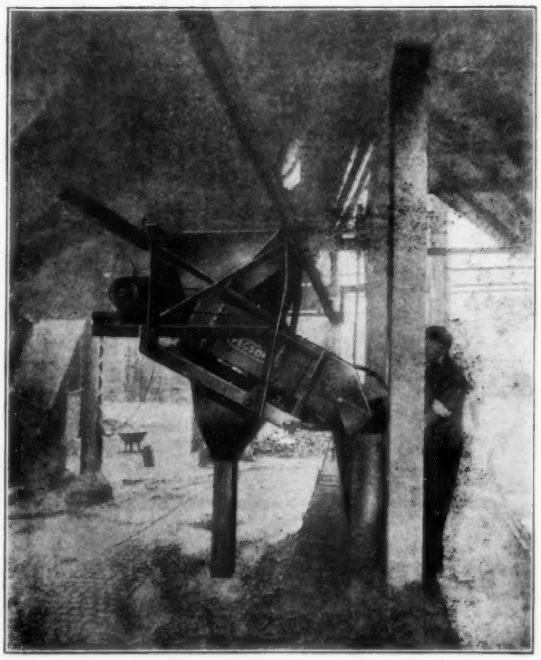
STOCKTON-ON-TEES

Debreezing Screens



Portable unit on overhead runway in Northern Gasworks consisting of "Live-wire" Debreezing Screen and bagging chute.

OF PROVED EFFICIENCY

An increasing number of Gasworks are installing Pegson Primary and Debreezing Screens. The number of repeat orders placed after a period of satisfactory operation proves definitely the high efficiency of these inexpensive machines.

PEGSON LIMITED
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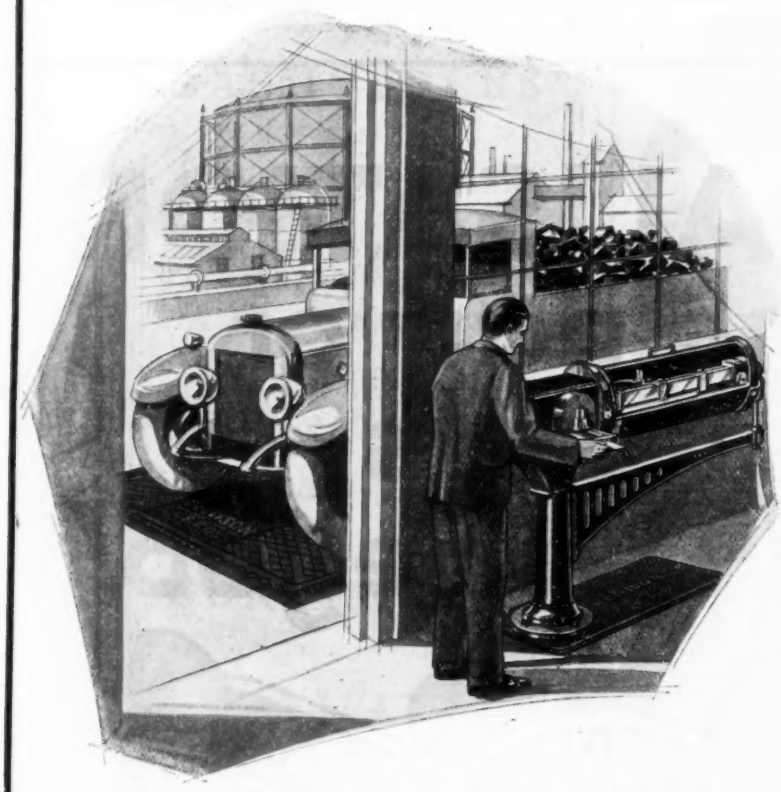
Have you heard about PEGSON-TELSMITH VIBRATING SCREENS?

SPECIALISATION —one pair of hands— one job!

Complete range of 30-cwt., 2-ton and 3-ton vehicles. Chassis prices ranging from £198. Send for Catalogue G.J.

ours is commercial vehicles

THE LARGEST BRITISH MANUFACTURERS SPECIALISING EXCLUSIVELY IN COMMERCIAL VEHICLES



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Adopt the

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No more disputes, only accurate records can be made.

Weigh the load. Close cover. Insert ticket. Write the name. Pull handle.

YOU THEN HAVE A DELIVERY TICKET FOR THE DRAYMAN AND A COMPLETE RECORD IN THE MACHINE. THE TAPE IS CHANGED TO A SUITABLE HOLDER AND POSTINGS MADE DIRECT TO ACCOUNTS.

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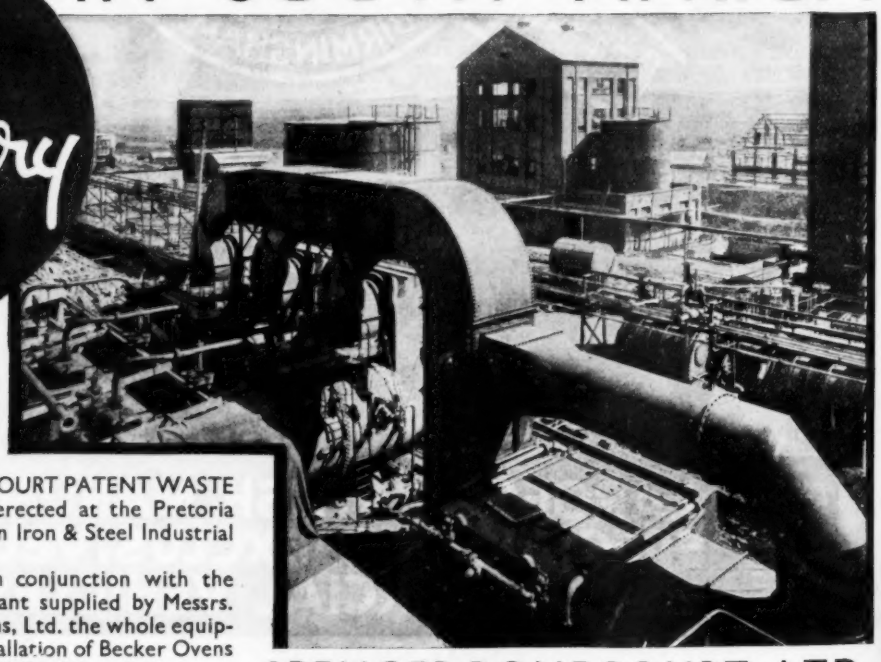
Waste Heat Recovery

IN SOUTH AFRICA



Three SPENCER-BONECOURT PATENT WASTE HEAT BOILERS being erected at the Pretoria Works of the South African Iron & Steel Industrial Corporation, Ltd.
These boilers will work in conjunction with the Colin Coke Dry-Cooling plant supplied by Messrs. Gas Chambers & Coke Ovens, Ltd. the whole equipment being part of the installation of Becker Ovens supplied by Messrs. Woodall-Duckham, Ltd.
The Boilers are designed to give up to 900 lbs of steam per ton of coke quenched.

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"THE WASTE HEAT RECOVERY SPECIALISTS"
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"BEATRICE" COOKERS

The cooker of to-day

WITH EIGHT OUTSTANDING NEW FEATURES

Besides the Standard Finish (Grey Mottle) "Beatrice" Gas Cookers can now be obtained in Green "Snowdrift" Mottle Enamel.

- **ONE BURNER OVEN AND BOTTOM FLUE OUTLET.**
- ONE PIECE ALL STEEL GATES AND OVEN SHELVES.
- **MAXIMUM COOKING SPACE IN OVEN, WITH *NO PROJECTIONS AND CONSEQUENT EASE IN CLEANING.***
- HOT PLATE BURNERS SPACED TO GIVE FULLEST EFFICIENCY.
- HOT PLATE BARS IN TWO SECTIONS ONLY AND CANNOT BE WRONGLY REPLACED.
- OVEN AND DOOR LINED WITH CELLULAR ASBESTOS.
- GREY MOTTLE AND WHITE ENAMEL FINISH AS SHOWN.
- SPRING LOADED CHROMIUM PLATED TAPS. SAFETY SELF-LOCKING OVEN TAP.

Provincial Selling Agents in Great Britain and Ireland for Gas Fires, Radiators, and Cookers manufactured by John Harper & Co., Ltd.

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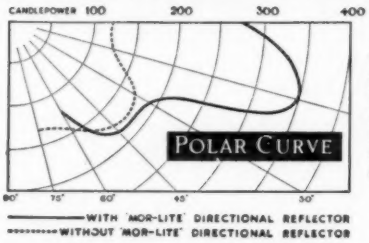
DOES 100% INCREASE IN ILLUMINATION APPEAL TO YOU?

TYPE G LANTERN WITHOUT MOR-LITE REFLECTOR

The Parkinson

MOR-LITE DIRECTIONAL REFLECTOR FOR GAS LIGHTING



The curve shows the Directional Increase in Illumination at no extra cost for Gas

TYPE G LANTERN WITH MOR-LITE REFLECTOR

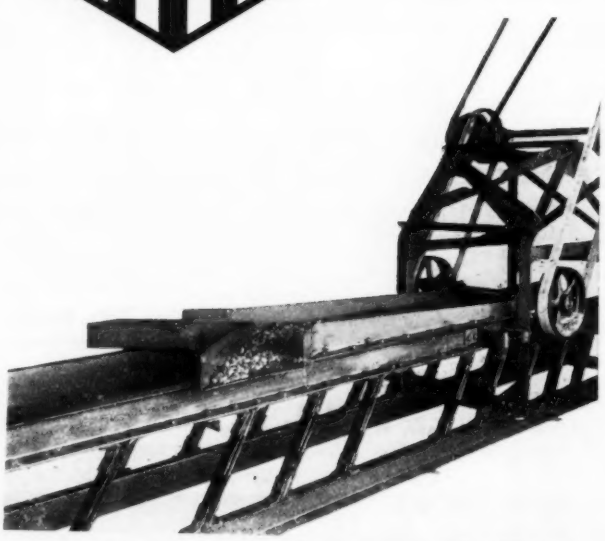
1. THE "MOR-LITE" DIRECTIONAL REFLECTOR increases the candle power by reflection at low angles where light is most needed.
2. Using a Twin Burner with No.2 medium mantle there is a directional increase from normal 150 c.p. to over 350 c.p. in illumination.
3. Can be fitted in a moment. Can be instantly adjusted both vertically and horizontally to give maximum light service.
4. Wing reflectors can be adjusted by wing nuts to meet every need.
5. Wings lift off instantly for Lamp Cleaning and are replaced without disturbing adjustments.

Send for sample and price list.

W. PARKINSON & CO., BIRMINGHAM · LONDON & BELFAST

INCORPORATED IN PARKINSON & COWAN (GAS METERS) LTD.

COKE SCREENS.



"H.H." COKE SCREEN AT WOLVERHAMPTON GAS WORKS.

THE ONLY LOGICAL WAY IN WHICH TO SCREEN COKE IS TO SEPARATE THE LARGER SIZES FIRST AND TO ELIMINATE THE BREEZE LAST OF ALL. This is the method we adopt in the "H.H." Coke Screen, which is characterised by very high screening efficiency, over 95% being obtained in actual practice. The power consumption of this screen is much lower than that required for rotary screens, while the machine acts also as a conveyor, thus facilitating distribution of the graded products into bunkers. ***The only moving part is the shaft carrying the two unbalanced pulleys which actuate the screen,*** there being no cams, rockers, or other complicated parts to get out of order. These screens are built in lengths up to 25 ft., two or more screens being arranged in series where greater lengths are to be covered. Each screen is designed to suit the particular number of grades and the distribution required.

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Peebles
DISTRICT GOVERNORS
are used everywhere

Evidence of the value of Peebles' District Governors is afforded by the imposing list of Gas Companies and Corporations which have installed this apparatus. To give this list *in toto* would occupy much more space than is at our disposal in this announcement. The few names of users below are representative :

Gas Light & Coke Co.	**Brighton**
Tottenham	**Maidstone**
Croydon	**Bournemouth**
South Suburban	**Portsmouth**
Glasgow	**York**
Edinburgh	**Newcastle**
Southampton	**Folkestone**

South Metro. Gas Co.

Some of the Peebles' District Governors are weight loaded, others are loaded by pneumatic or gas pressure. We make all types in sizes from 3"—36" diameter, and for pressures to 10 lbs. reducing to inches W.G. at one step.

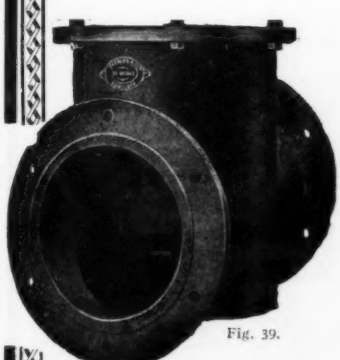
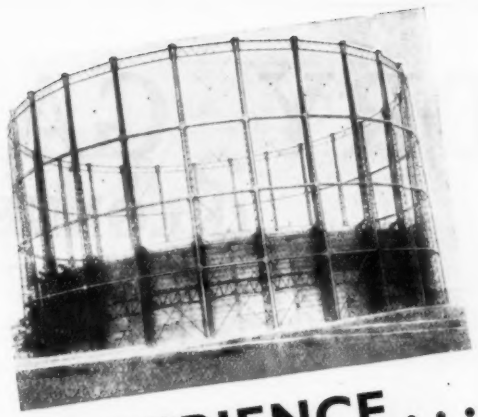


Fig. 39.

The different patterns are described in Peebles' Gas Governor Catalogue. Ask us to send you a copy

PEEBLES' ENCLOSED TYPE PRESSURE LOADED DISTRICT GOVERNOR

PEEBLES & CO. LTD.
Jay Works
Bonnington,
EDINBURGH



EXPERIENCE . . .

We have the advantage of over 100 years' experience in the design and manufacture of plant of every description for the Gas Industry.

We have been entrusted with contracts for all types of Holders and Gas Plant for use in all parts of the World.

Your contracts can be placed in our hands with absolute confidence. When specialized knowledge and first hand information are required you will find us ready to help.

The **HORSELEY BRIDGE & ENGINEERING CO. LTD**
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THOMAS PIGGOTT & CO., LTD.
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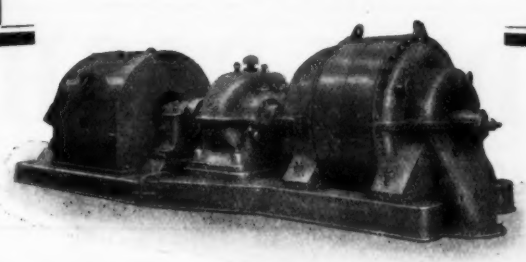
TURBO-COMPRESSORS & EXHAUSTERS
FOR AIR AND GAS.

* * *

We build a complete range of Compressors & Exhausters for air and GAS, suitable for all purposes connected with the Gas Industry, including Turbo-Compressors for large capacities, as illustrated below.



WRITE FOR PAMPHLET No. 1018 GIVING PARTICULARS :—

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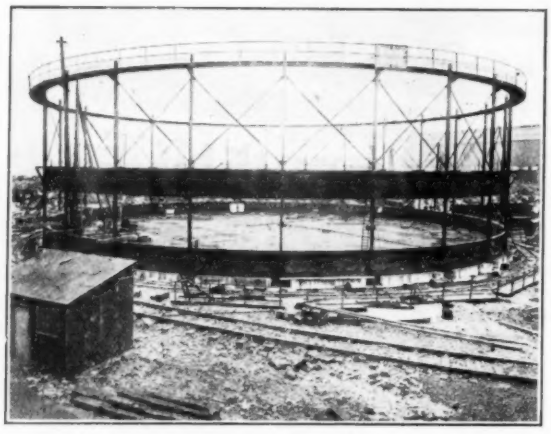
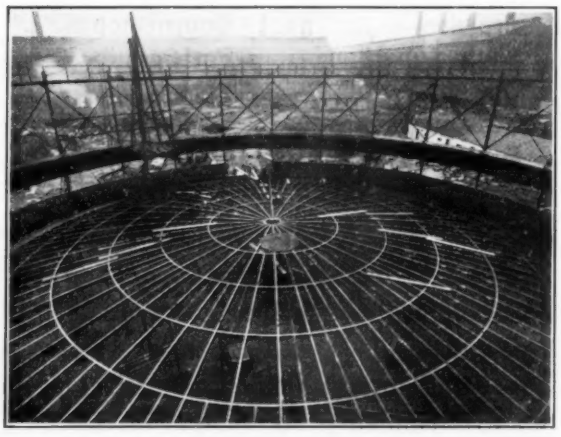
RANELAGH WORKS, IPSWICH.
TELEGRAMS: REAVELL, IPSWICH. TELEPHONE: 2124 & 5

DRY GASHOLDERS
(KLONNE PATENTS)



VIEW SHOWING BOTTOM PLATING AND COMMENCEMENT OF ERECTION OF SIDES OF SHELL PLATES.

VIEW SHOWING ERECTION OF FRAMING FOR FLOATING DISC.



PHOTOGRAPHS SHOWING PROGRESS OF ERECTION OF KLONNE DRY GASHOLDER TWO MILLION CUBIC FEET CAPACITY
AT THE PORT TALBOT WORKS OF THE BRITISH (GUEST, KEEN, BALDWIN) IRON & STEEL COMPANY
CONTRACTORS—THE HORSELEY BRIDGE & ENGINEERING COMPANY, LTD.

DRY GASHOLDERS LTD.
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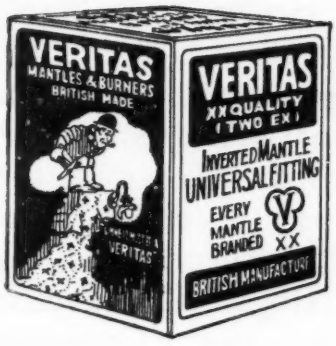
THOS. PIGGOTT & CO., LTD., Atlas Works, Spring Hill, Birmingham.

THE HORSELEY BRIDGE & ENGINEERING CO., LTD., Tipton, Staffs.

VERITAS

MANTLES



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STRENGTH
BRILLIANCY
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BUILT UP ON THE EXPERIENCE OF YEARS AND ARE EQUALLY IN FAVOUR WITH GAS ENGINEERS AND THE PUBLIC.

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Works:
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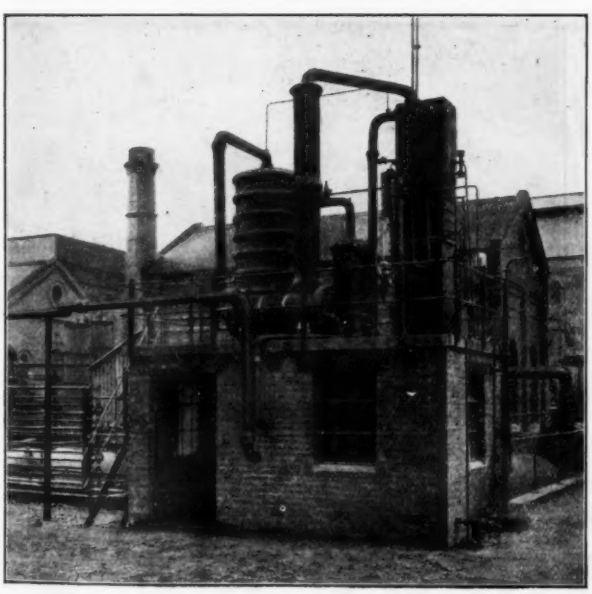
50,000 Gallons of BENZOLE
produced daily by
SIMON-CARVES BENZOLE PLANTS



Simon-Carves Benzole Plant at North Shields for the Newcastle-upon-Tyne and Gateshead Gas Co., recovering 275 gallons per day of 90% Benzole at 120° C.

Main steam and water feeds on Simon-Carves Benzole plants are thermostatically controlled, thus only occasional attendance is required on the plant.

Over 30 years' experience in the construction and operation of benzole plants ensures dependable and satisfactory operation.

Write to us for full particulars. Our expert advice is at your service.

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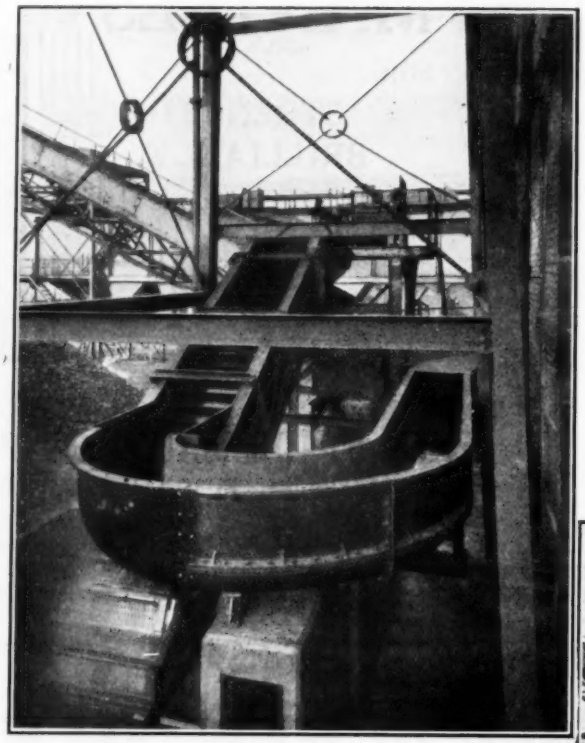
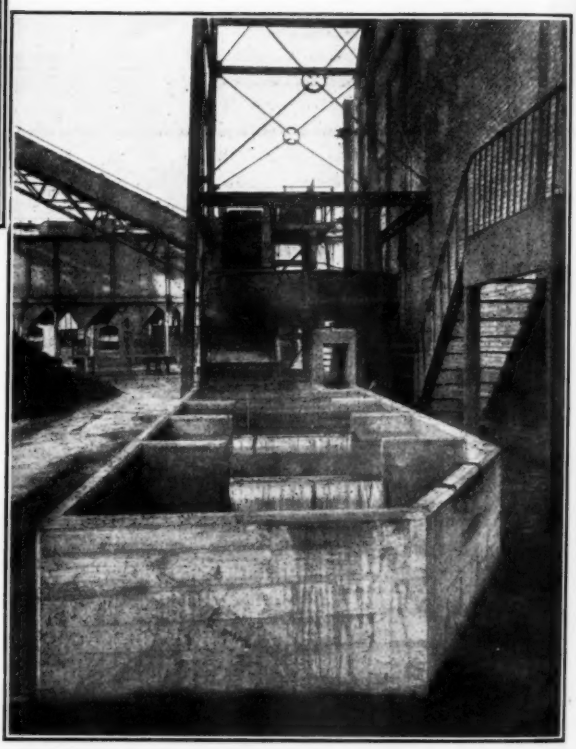
CHEADLE HEATH, STOCKPORT

Gasworks Plant by GIBBONS = = =



Retort House Buildings • Complete Carbonising Plants • Vertical and Horizontal Installations • Charging and Discharging Machines (Guest-Gibbons Patent) • Retort and Furnace Fittings • Elevators, Hoppers, and Conveying Machinery



Le Fleurve Coke Conveyor, Installed at the Rochester Works of the Rochester, Chatham, & Gillingham Gas Co.

"GIBBONS-KOGAG" COKE OVEN PLANT

GIBBONS BROS., LTD.,

DUDLEY, WORCS.

AND AT LONDON, BRISTOL, AND DARLINGTON.

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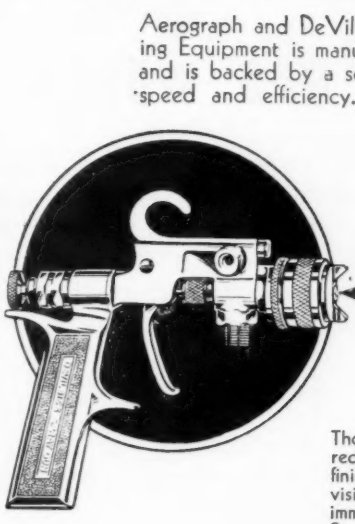

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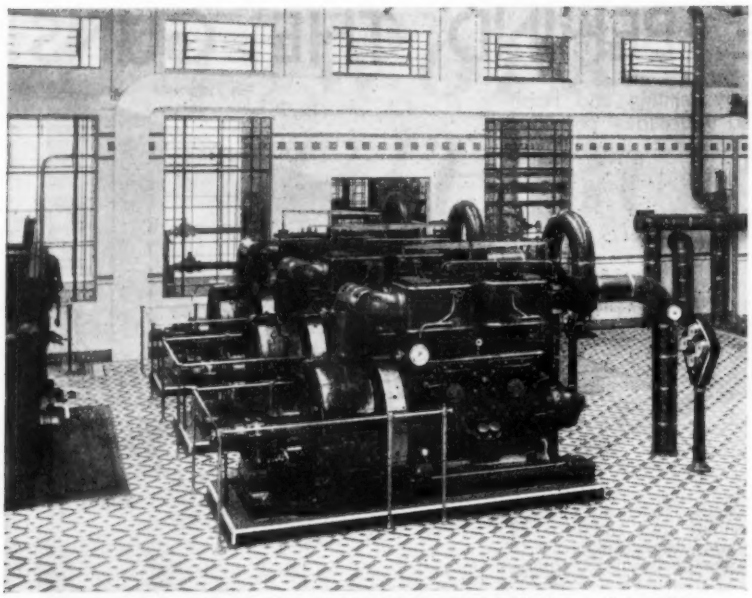

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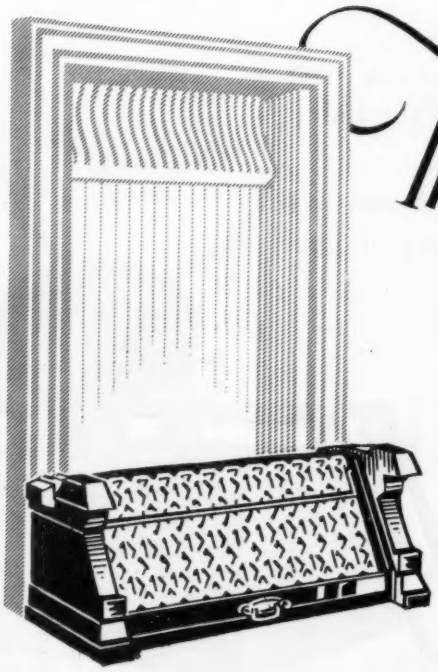

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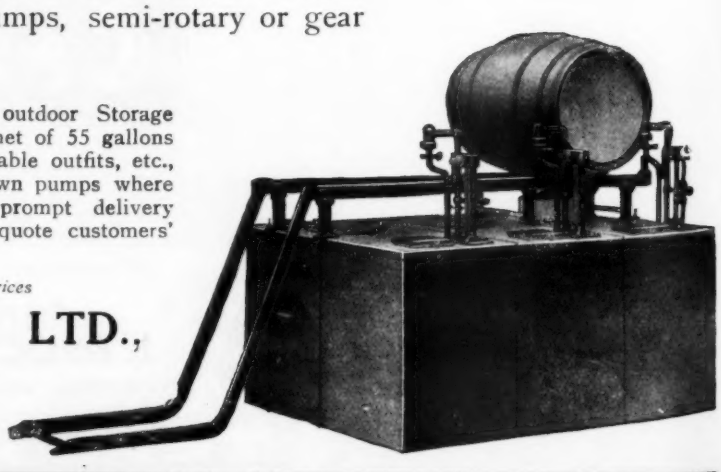

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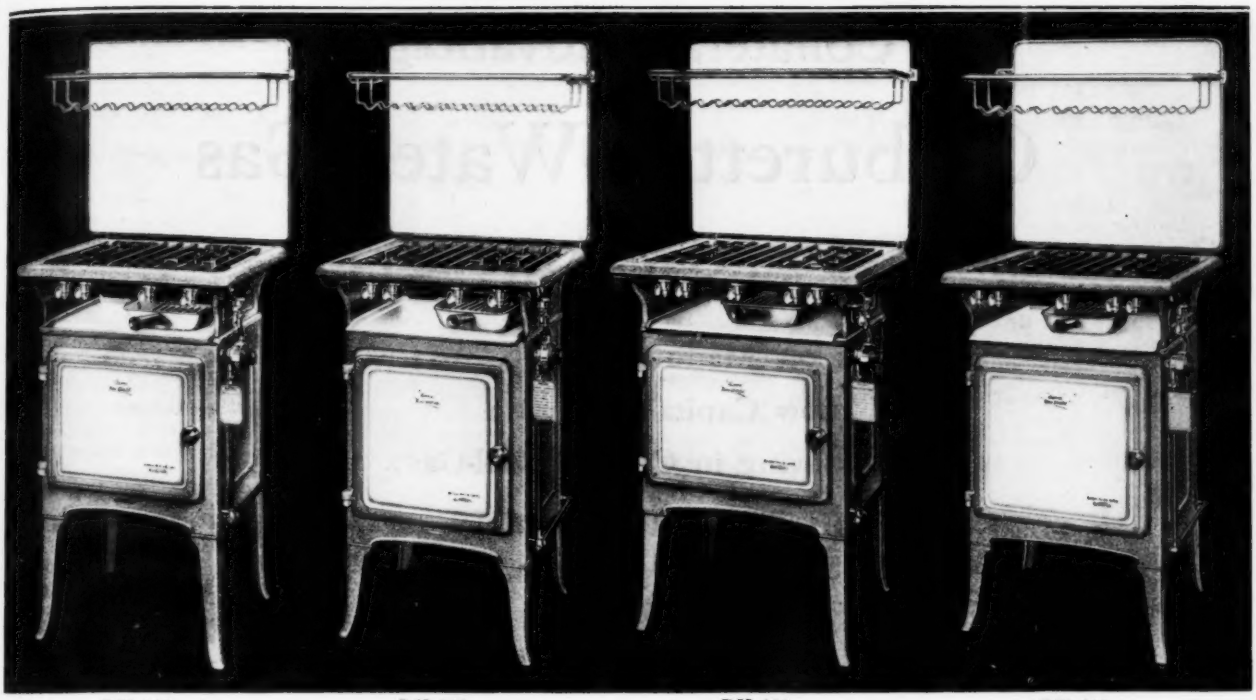

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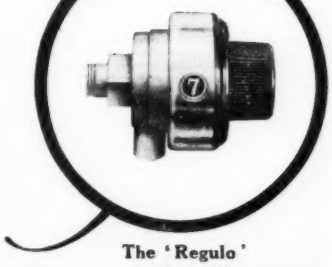

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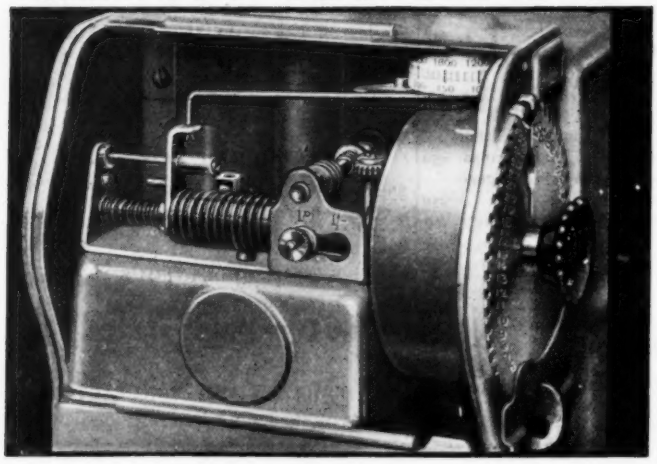

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THE GAS JOURNAL

AUGUST 30, 1933

Vol. 203. 85th Year No. 3667

A Glance at the Contents—

North British Association.

Extracts from the Annual Report of the North British Association of Gas Managers will be found on p. 452.

Canadian Gas Association Convention.

A list of the "home" contributions to be presented at the Annual Convention of the Canadian Gas Association, to be held in Ottawa on Sept. 18 and 19, appears on p. 448.

The Gas Industry in Argentina.

An article by Mr. P. Ashley Cooper, Chairman of the Primitiva Gas Company, of Buenos Aires, Ltd., on the progress and the present position of gas in Argentina, published in the Summer Number of *West's Gas*, is reprinted on p. 454.

Canada and the United States.

Surveys of the Gas Industry in Canada and the United States, by eminent authorities, are published. Mr. Hugh McNair deals with Canada on p. 453, while Mr. Arthur Hewitt, President of the American Gas Association, gives a picture of American conditions on p. 448.

Shanklin's Up-to-Date Gas-Works.

One of the recent absorptions is that of the Ventnor Gas and Water Company by the Shanklin Gas Company, who have now completed an extensive scheme of alterations and additions to their carbonizing and ancillary manufacturing plant. The re-modelled works form the subject of an illustrated article on p. 455.

The Gas Industry in 1932.

On the following page we comment on the Board of Trade Return relating to authorized gas undertakings for the year 1932. Notable features are the increases in the amount of gas sold for public lighting and the number of consumers. The total gas sold showed a slight decline, as was to be expected in view of the industrial depression and the mild weather conditions in 1932. Certain statistics extracted from the Return are published on p. 450.

Rational Examination of Coal.

Dr. Wilfrid Francis condemns any system of classification or any method of examination of coal that fails to consider the type of coal and the nature of the ingredients present. It is lamentable, he says, that so much money and energy are being devoted to the ultimate and proximate analyses of coal under national auspices, while the development of rational methods of examination and classification is being left to individual effort. [p. 459.]

Carburetted Water Gas.

We conclude the contribution on carburetted water gas by Messrs. Humphreys & Glasgow by publishing Parts 2 and 3. These are concerned with the reflex effect of carburetted water gas on the gas-coal and residuals markets, and the permanence of the advantages of auxiliary water gas from its introduction to the present time. The authors maintain that the reflex benefits of carburetted water gas amount to ten times the cost to the Gas Industry of the new Duty of a penny a gallon on imported oil, which, on 1931 figures, is £221,350. [p. 451.]

Forthcoming Engagements

Sept. 4-7.—ASSOCIATION OF PUBLIC LIGHTING ENGINEERS.—Tenth Annual Meeting and Conference at Margate.

Sept. 5.—S.B.G.I.—Meeting of Council, 2.30 p.m.

Sept. 5.—I.G.E.—Meeting of Gas Education Executive Committee, 4 p.m., 28, Grosvenor Gardens, S.W. 1.

Sept. 7.—NORTH BRITISH ASSOCIATION.—Annual Meeting in Paisley.

Sept. 7.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (WESTERN DISTRICT).—Commercial Meeting at Exeter.

Sept. 8-Oct. 16.—I.G.E.—Visit to Canada and the United States of America.

Sept. 8.—I.G.E.—Council Luncheon at the Shipping, Engineering, and Machinery Exhibition, Olympia. Members' tea at the Exhibition.

Sept. 12.—NATIONAL GAS COUNCIL CENTRAL EXECUTIVE BOARD. There will be no meeting of the Board during the month of August.

Sept. 21.—WALES AND MONMOUTHSHIRE ASSOCIATION.—Meeting at Porthcawl.

Sept. 22.—I.G.E.—Meetings of Liquor Effluents and Ammonia Sub-Committee, 10.30 a.m.; Joint Research Committee, 2.45 p.m., 28, Grosvenor Gardens, S.W. 1.

Sept. 25-27.—B.C.G.A.—Annual Conference at Bournemouth.

Sept. 29.—I.G.E.—Meeting of General Research Committee, 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Oct. 17.—I.G.E.—Meetings of Board of Examiners, 2.30 p.m.; Publications Committee, 3 p.m.; Education Executive Committee, 4 p.m., 28, Grosvenor Gardens, S.W. 1.

Nov. 6.—I.G.E.—Meetings of Finance Sub-Committee, 2 p.m.; Membership Sub-Committee, 2 p.m.; General Purposes Committee, 3 p.m.; Council, 4.15 p.m., 28, Grosvenor Gardens, S.W. 1.

Nov. 7-8.—I.G.E.—Autumn Research Meeting, Institution of Mechanical Engineers.

Nov. 9.—S.B.G.I.—Autumn General Meeting, Hotel Metropole, London.

Nov. 14.—I.G.E.—Session at the Public Works, Roads, and Transport Congress and Exhibition, Royal Agricultural Hall, 11 a.m.; Joint Session of the Institution and the Association of Public Lighting Engineers, 3 p.m.

Nov. 14.—I.G.E.—Meeting of Gas Education Committee, 5 p.m., 28, Grosvenor Gardens, S.W. 1.

Dec. 11.—I.G.E.—Meetings of Finance Sub-Committee, 2 p.m.; Membership Sub-Committee, 2 p.m.; General Purposes Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Dec. 12.—I.G.E.—Meetings of Council, 10 a.m.; Gas Education Executive Committee, 4 p.m., 28, Grosvenor Gardens, S.W. 1.

Dec. 21.—I.G.E.—Meeting of Refractory Materials Joint Sub-Committee, 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.

EDITORIAL NOTES

Trends of the Industry

THE year 1932 was one of severe industrial depression, and throughout the weather was unusually mild. Both these factors had their adverse effects on the Gas Industry, and, as was to be anticipated from the results of individual undertakings already published in the "JOURNAL," the sale of gas for the year shows a decline. The decrease on 1931 for all authorized gas undertakings in Great Britain amounted to 1·3%, or 3705 million c.ft. These figures are taken from the Board of Trade Return, Part 1, giving particulars relating to manufacture and supply, which has just been issued by H.M. Stationery Office.

Besides indicating the influence of climatic conditions on gas sales, the foregoing result is an index of the reduced spending power of the consumer. One does not jump for joy at the result—in fact, the less pleasing the figure becomes when it is realized that during the year there was a very big addition to the number of consumers, nearly a quarter of a million (2·2%). But, taking all factors into consideration, the stability and strength of the Industry are amply proved; and the major impression after studying the Return is that never before has the Industry had such an enormous field of service, and that the slightest recovery towards national prosperity will synchronize with greater gas usage. The consumption per consumer (that all-important consideration) was lower in 1932 than in 1931; but a return to better times, coupled with persistent sales efforts helped by amended legislation, will have its due effect. The Gas Industry has now the enormous total of 9,773,015 "authorized" consumers; it has never had such a vast army of adherents, never a more powerful reason for employing modern selling methods. The Board of Trade Return for 1932 is a positive encouragement.

One of the striking facts recorded is that, though manufacture of gas declined by 1·4%, sales dropped by only 1·3%—evidence of the tightening-up of distribution practice. Another more significant fact is that, for the first time, the number of ordinary consumers diminished, though it is true that the decrease is slight. All additional consumers were prepayment—again a sign of industrial conditions, and proof, if any be needed, that our Industry does indeed serve the whole community with an essential commodity. In 1920, out of a total of 7,448,332 consumers, 4,030,647 were prepayment. The figures for 1932 are 9,773,015 and 5,783,449. The trend of modern housing, and a glimpse of its incidence on the Industry, is shown by the increase in main mileage, which now stands at 53,156. In regard to manufacturing figures, the amount of water gas decreased by as much as 5·7%, 1,375,000 gallons less of oil being used. The quantity of tar made shows a decrease in keeping with the smaller quantity of coal carbonized, while, as was to be expected, there is a relatively enormous drop in the sulphate of ammonia figure. An important item is the quantity of coke oven gas bought—which, at 15,411 million c.ft., is an increase of nearly 11%.

The total quantity of gas sold in 1932 by the 734 authorized undertakings was 286,988 million c.ft. The figure 734 well demonstrates the Industry's policy. In 1930 the Return related to 767 undertakings, and the 1931 Return to 749. Since the 1931 Return a further sixteen undertakings have been absorbed by others: The Brentwood and Southend-on-Sea Undertakings by the Gas Light and Coke Company; the Brierley Hill by the Dudley, Brierley Hill, and District Gas Company; the Brodsworth and South Emsall Undertakings by the Royston and Brodsworth Gas Company; Cranleigh by the Guildford Gas Light and Coke Company; Elsecar by the Sheffield Gas Company; Flint by the British Gas Light Company, Ltd. (Holywell Undertaking); Hemel Hempsted by the Watford and St. Albans Gas Company; the Hertford, Hoddesdon, and Ware Undertakings by the Tottenham and District Gas Company; Ogley Hay by the Cannock District Gas Company, Ltd.; Sutton by the Wandsworth and District Gas Company; Ventnor by the Shanklin and Ventnor Gas Company; and the Worthing Undertaking by the Brighton, Hove, and Worthing Gas Company. These absorptions in part account for certain changes in calorific value declarations made in 1932; and the value of 500 B.Th.U. is predominant in the amended figures. There is a definite upward trend from the 475 mark to the 500 mark. Burnley, for instance, has made this change; and, conversely, an interesting change is that of the Middlesbrough Corporation, who have come down from 525 to 500 B.Th.U. This levelling-up of calorific value is a gratifying feature. In regard to Scotland there is only one alteration, the Newport Corporation having dropped from 500 to 450 B.Th.U.

One of the best features of the Return relates to public lighting. As staunch believers in the lighting load—readers know our views on this subject—it is most encouraging to learn of the substantial increase effected in 1932. A year ago we were able to record an increase on the load for 1930; and this increase is being maintained. From 11,788 million c.ft. in 1931, the amount of gas sold for public lamps rose to 12,131 millions in 1932—not very much less than the total sales of the Birmingham Gas Department. Since 1920 the public lighting load has grown by over 5000 million c.ft.—again to make a comparison, this increase alone is more than the total sales of the Sheffield Gas Company. These figures should spur us on to greater endeavour.

Statistics extracted from the Return are set out on a later page of to-day's "JOURNAL." The conclusion to be drawn from them is that this is no time for despondency, but a time when every ounce of "kick" we put into our salesmanship will be rewarded.

Carburetted Water Gas

LAST week we published the first part of a contribution by Messrs. Humphreys & Glasgow, Ltd., on the financial benefits of carburetted water gas to the Gas Industry, in which it was shown that the effect of the Customs Duty of a penny a gallon on imported oil is exceedingly small when the advantages of peak load carburetted water gas in place of peak load coal gas are assessed in terms of pounds, shillings, and pence. The case made out in last week's article was that, "including works capital charges, peak load carburetted water gas costs only three-fifths of the cost of peak load coal gas for the same service."

To-day we pass on to the reflex effect of carburetted water gas on the gas-coal and residuals markets (Part 2), and the permanence of the advantages of auxiliary water gas from its introduction to the present time (Part 3). During 1931—the figures are taken from the Board of Trade Returns for that year—14% of the total gas made was carburetted water gas, and the extent of carburetting was 1·3 gallons of oil (each gallon yielding 1·25 therms of gas) per thousand in the water gas. The replacing of this carburetted water gas by straight coal gas would have necessitated an increase of 13·5% on the gas-coal used. In turn, this means that the coke and tar made would have increased in like proportion; and to the 13·5% extra coke made must be added the amount which would have been used to manufacture water gas—namely, 804,000 tons—making a total increase in coke

for sale of 26½%. The authors are speaking, of course, in terms of coal gas of 500 B.Th.U., when they ask what would be the effect of this enormous increase in coal consumption and coke and tar made on the market prices of "residuals" and hence the cost of gas into holder.

The answers to these all-important questions are set out in Part 2 of the contribution. It is maintained that such an increase as 26½% in the coke for sale would collapse coke prices; and it is pointed out that each decrease of half-a-crown per ton in the selling price of coke would equalize an addition of 6·54d. per 1000 c.ft. to the cost of the water gas; or would decrease the year's value of the coke by £1,112,320. Again, were it not for water gas, the coal industry would gain a monopoly of the Gas Industry; and every increase of one shilling per ton of gas-coal would raise the year's coal cost by £988,730—sufficient to compensate an addition of 5·82d. per 1000 c.ft. to the cost of the water gas. On this basis the authors conclude that the reflex benefits of carburetted water gas amount to ten times the cost to the Gas Industry of the new Duty of a penny a gallon, which, on the 1931 figures, is £221,350.

Finally, we come to the permanence of the advantages of auxiliary carburetted water gas. It is not too much to say that the Gas Industry owes much of its success to carburetted water gas. Our Industry has an enviable reputation for reliability of supply of light and heat; and there have been occasions when this continuity of service has been made possible only by the manufacture of carburetted water gas. Moreover, the important part played by carburetted water gas in ensuring uniformity of quality of the gas supplied will be readily acknowledged by all. It is forty-two years since the first carburetted water gas plant was laid down at the Beckton Station of the Gas Light and Coke Company. The present daily capacity of the Beckton installation of carburetted water gas plant exceeds 40 million c.ft., while the aggregate capacity of such plant at the Company's other manufacturing stations is a matter of 56 million c.ft. daily—simple facts which tell their own story. Two other instances of gas undertakings having carburetted water gas plant are quoted by the authors in the third part of their article—Belfast, who, with 29% of carburetted water gas in the total make for the year ended March 31 last were able to offer gas to domestic consumers at 2s. 2d. per 1000 c.ft. and to industrial users at 1s. 10d., and show a substantial profit; and Croydon, chosen because it approximates the size of the example dealt with in last week's "JOURNAL," and is equipped with equally modern coal gas and carburetted water gas plants. The authors find that, excluding capital costs, but allowing for the new Duty, base load coal gas throughout the year 1932 would have cost Croydon over 6% more per therm than the peak load carburetted water gas. This apart from reflex benefits.

We are sure that this remarkable contribution by Messrs. Humphreys & Glasgow will—as we said last week—"cause more than a flutter in gas engineering circles."

Gas Serves the World

WE would say that there is every justification for the claim of the Editor of the 1933 Summer Number of *West's Gas* that the survey of the position of the Gas Industry throughout the world which is contained therein constitutes a unique record. This is a matter upon which Mr. Norman Lazenby, the Editor in question, and West's Gas Improvement Company, Ltd., are to be congratulated, while at the same time, in one particular sense, we are almost inclined to feel just a little sorry for them. The setting-up of records in the way of good achievements has always the one disadvantage that each time a fresh height is reached the task of passing it becomes more difficult. The Editor of *West's Gas* will find himself hard put to it in 1934 to beat 1933. There may be still something "up his sleeve," but if so he must take a big size in jackets! This was one of the thoughts that came to mind as we again took up the engrossing Summer Number, whose very cover—the work of Mr. Lazenby—strikes an inspiring note for the Gas Industry, depicting, as it does, bunsen burners encircling the world. "Gas serves the world" is a sound slogan.

And this is but the beginning. As stated when referring in our editorial columns a fortnight ago to this achievement, the list of contributors is numerically an impressive one, though its length is the least of its qualities. What is of transcending importance is the fact that the writers are in every case authorities upon the gas affairs of the countries which they represent. The contribution of Sir David Milne-Watson, LL.D., D.L., has already appeared in the "JOURNAL;" and to-day we add to our indebtedness to this Summer Number, as we shall even hope to do again, by plucking further fruit, which can be so easily spared from the richly laden orchard of *West's Gas*. What is found there will be sufficient to satisfy the keenest craving for knowledge; while there are also a large number of pictures both selected and presented so as to please the most artistic eye. Conquest of the air has given us much, and not the least of its bounties is the aerial photograph, of which *West's Gas* contains many outstanding examples.

Great Britain Leads in Europe

IN his concluding article, Alderman F. J. West, C.B.E., himself admirably focuses attention on some of the principal lessons conveyed by the contributions. He points to a table by M. Laurain, Director and Consulting Engineer to the Société du Gaz de Paris, and a Past-President of the French Gas Association, setting forth the consumption of gas in the principal countries of Europe in 1931. This, as we have already pointed out, shows Great Britain to lead both in the matter of total production and annual consumption per head of population. In annual production Germany comes second, though in consumption per head she is no better placed than sixth. As a matter of fact, Great Britain consumes more than twice as much gas, both in bulk and *per capita*, as the next largest gas consuming country in Europe. What is probably the most interesting case, however, in the opinion of M. Laurain, is that of Switzerland, where the electrical industry is in a privileged position, due to the abundance and relative cheapness of hydro-electric current, while the Gas Industry is obliged to import all the coal which it requires. In spite of this unfavourable position, Switzerland occupies the fourth place among the countries of Europe as regards consumption of gas per head of population. Then there is the case of Sweden, which is dealt with by Mr. G. H. Hultmann, Chief Engineer to the Gas Department of Stockholm. The circumstances of Sweden are in some ways similar to those of Switzerland; yet Mr. Hultmann tells us that "competition between gas and electricity is hardly of any consequence, save in the smallest towns which charge the highest price for gas." Looking at the position generally (and here we are repeating for emphasis figures quoted by us a fortnight ago), Sir David Milne-Watson shows that in Great Britain the consumption of gas has doubled in the last thirty years. Mr. P. C. Holmes Hunt says that the demand in Australia has increased by 71% in 20 years. Mr. M'Nair notes that it has increased 40% in Canada since 1923. Mr. Kennedy records an increase in New Zealand of 54·5% in 20 years. Mr. Hewitt shows that the increase in the United States has been such that the consumption of gas has multiplied 15·6 times since 1908.

Regional Planning

THERE are many other absorbing studies in *West's Gas*—among them the article by Dr. Karl Bunte, Principal of the Gas Institute of Karlsruhe and Editor of *Gas- und Wasserfach*—but we must now leave this Summer Number with our readers. The story of the Gas Industry at large is highly encouraging, while the position of Great Britain is particularly gratifying. Our country has attained a standard in the sciences of Gas Production and Gas Selling which we feel sure it will long maintain, and which places it well in the forefront in most matters relating to the Gas Industry. Neverthe-

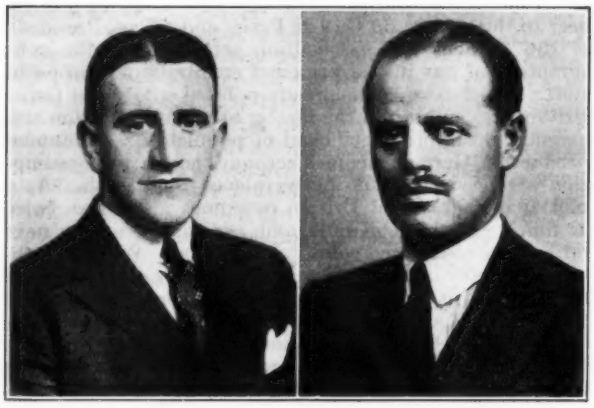
less, there must be always in mind Sir David Milne-Watson's warning that " we cannot afford to rest upon past achievements."

When the history of to-day and to-morrow comes to be written, it will doubtless be recorded that in Regional Planning this country has once again offered a lead. May we repeat what Sir David Milne-Watson has to say on this matter: " Just as district centres have been set up to deal with the initial gas problems of the smaller undertakings, so I look forward to seeing the whole administration of groups of such undertakings being carried out from suitable centres under the ægis of large undertakings. Just as the single craftsman is giving place in industry to the organized team in a large well-designed factory, so the ' Jack-of-all-trades ' (enthusiastic and able though he may be) in the small gas undertaking must give way to the team of specialists. Central buying of coal and other supplies will greatly decrease their cost, the provision of capital from a central source will make it possible to install up-to-date plant economically as it is required, specialized technical control will enable far higher operating efficiencies to be attained, centralized sales and accounting departments will increase turnover and decrease costs, centralized working-up will materially increase the return on bye-products, and competition will be met on an organized basis. It is to this regional planning of the Gas Industry that I look for the greatest advances in the near future; for it is only in this way that the technical advances which have already been made and are being made at an ever-increasing rate can be applied throughout the Industry to the lowering of costs and the increasing of efficiency. Then the Industry will receive the public and political approval that its activities and service deserve, and its value to the national resources of the country will stand fully revealed and appreciated."

PERSONAL

ANGLO-AMERICAN OIL COMPANY APPOINTMENTS.

On the appointment of Mr. E. E. Soubry to the Board of Directors of the Anglo-American Oil Company, Ltd., Mr. H. S. Tegner and Mr. A. Waterston have been ap-



Mr. A. Waterston. Mr. H. S. Tegner.

pointed Joint General Sales Managers of the Company in Great Britain. Mr. Tegner will control all territory South of Derby, while Mr. Waterston will direct the North of England and the whole of Scotland.

* * *

RETIREMENT OF MR. JAMES E. KENSHOLE.

We learn that Mr. James E. Kenshole, Engineer and General Manager to the Merthyr Tydfil Gas Company, intends to retire on Oct. 31 next after 38 years' service with the Company.

During his term of management the sales of gas have increased from 69 to 196 million c.ft. per annum; and although unemployment is very acute in the Company's area of supply, the sales of gas continue to increase.

In 1909 the Company built a works on a new site, and have for some years been selling gas at a considerably lower price than any undertaking in Wales, the present price being 6·4d. per therm.

Mr. Kenshole is well known in gas circles, being Chairman of the District Executive Board of the National Gas Council for South Wales and a Member of the Central Executive Board of the National Gas Council, Vice-Chairman of the Federation of Gas Employers for the South Wales District, a Member of the Central Committee of the Federation of Gas Employers, and Chairman of the Commercial Section of the Wales and Monmouthshire Association of Gas Engineers and Managers. He is a Past-President of the Wales and Monmouthshire Association.

Mr. Kenshole is not entirely severing his connection with the Company, as the Directors are retaining his services as Consulting Engineer.

The New Engineer and General Manager.

Mr. W. T. Kenshole, Chief Assistant Engineer to the Lea Bridge District Gas Company, has been appointed Engineer and General Manager of the Merthyr Tydfil Gas Company. Mr. W. T. Kenshole was articled to his father, and for a time held the position of Junior Assistant and Chemist to the Merthyr Tydfil Gas Company.

In May, 1916, he joined the staff of Mr. F. W. Cross at Lea Bridge as Junior Assistant and Chemist, and in October, 1925, upon the appointment of Mr. D. C. Cross as Engineer and Manager, Mr. Kenshole was promoted to the position of Chief Assistant Engineer.

During his service with the Lea Bridge District Gas Company, the annual make of gas has increased from 516 to 1093 million c.ft. per annum, which has necessitated the construction of practically a new works.

Mr. Kenshole has been closely associated with the London and Southern District Junior Gas Association since the war, and was President in 1928-29.

* * *

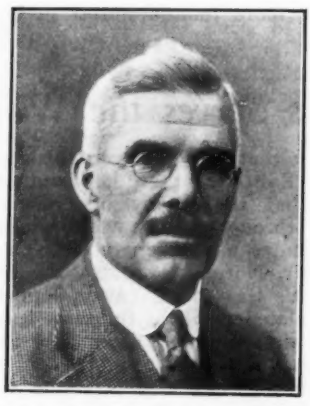
HALF-A-CENTURY WITH ONE FIRM.

On June 14 last, Mr. Walter R. Hawkins, Works Manager of the Gas Stove Department of the Cannon Iron Foundries, Ltd., of Deepfields, completed 50 years' service with the firm, and to celebrate this important event he was, on Aug. 25, presented by the Directors with a beautiful solid silver tray.

The tray was inscribed as follows:

> " Presented to Walter R. Hawkins by the Directors of the Cannon Iron Foundries, Ltd., Deepfields, in commemoration of 50 years' faithful service."

In each corner of the tray appears a facsimile of the signature of the four Directors—Mr. R. Talbot Clayton (Managing Director), Mr. R. D. Barnett Clayton, Mr. F. E. Sheldon Clayton, and Mr. W. Edgar Hawthorne.



MR. W. R. HAWKINS.

In making the presentation the Directors expressed themselves as very gratified to have as a member of their staff an employee with such a lengthy period of honourable service, as this definitely indicated that mutual goodwill so necessary for the success of any business undertaking.

In responding Mr. Hawkins mentioned the interesting

fact that his first job was in the Foundry itself, but this was for a short time only, as he was transferred to the Office. He was proud to have been associated with the firm for so long, and for this to be possible very fully confirmed the feeling of goodwill expressed by the Directors.

When the firm celebrated its Centenary in 1926 by taking the whole of the employees to Blackpool, Mr. Hawkins—together with other members of the staff who had completed 40 years' service—was presented with a suitably inscribed gold watch to record this.

Mr. Hawkins is well known locally, having figured in many of the progressive movements in the Coseley area. He has represented the firm for the last two years on the Juvenile Unemployment Committee.

* * *

Sir DAVID MILNE-WATSON and Mr. HENRY WOODALL have been elected Directors of the Dover Gas Company in place of Mr. W. R. MOWLL and Mr. H. CRUNDALL, resigned.

* * *

Dr. HAROLD G. COLMAN, the Consulting Chemist, has moved from Sentinel House, Southampton Row, to Parliament Mansions, Orchard Street, Victoria Street, S.W. 1. (Telephone Nos. Victoria 2661-2; telegrams, Colman, Harbordlab, Phone, London.)

* * *

Mr. J. W. HALL has resigned from the Board of Directors of the Bilston Gas Company. Mr. Hall was a Director for 44 years, during the last six of which he was Chairman. Mr. H. S. PRATT has been elected Chairman, and Mr. R. J. MILBOURNE has been elected to fill the vacancy on the Board.

* * *

The Leek Urban District Council have approved a recommendation of the Gas and Electricity Committee that Mr. D. K. GREEN, of Leigh, be appointed Assistant Gas Engineer to the Council.

OBITUARY

The death occurred on Aug. 22 of Mr. T. A. GUYATT, Engineer, Manager, and Secretary to the Ely Gas and Electricity Company, Ltd. Deceased was a Past-President of the Eastern Counties Gas Managers' Association, and for seven years held the office of Secretary and Treasurer. The Association was represented at the funeral on Aug. 25 by Messrs. F. Prentice, Ipswich; J. W. Auchterlonie, Cambridge; J. H. Troughton, Newmarket; H. R. Wimhurst, Bury St. Edmunds; and W. C. Chapman, Boston (Hon. Secretary and Treasurer). Death was due to heart trouble.

* * *

The death has occurred, at the age of 42, of Capt. WORTHINGTON COURTENAY CHURCH, T.D. Capt. Church, before the war, was Assistant to Mr. F. M. Paternoster at Felixstowe. He was badly wounded at Gallipoli. Afterwards he was Engineer to the Swaffham Gas Company, the Watton Gas and Coke Company, and the Fakenham Gas and Coke Company, Ltd., besides owning the Southminster Gas Company.

THE NEWS OF THE WEEK

"**Gas Always Scores**" is painted in large white letters on the gasholder adjacent to the Stoke City football ground. A very apt slogan.

The Penzance Gas Company was awarded first prize at Penzance Carnival on Saturday, Aug. 26, in the class for the best advertisement, and third prize in the class for the best trade exhibit.

The Accrington District Gas Board have adopted a proposal to supply gas to Wiswell. An Order is being sought to authorize the addition of the parish to the Board's area of supply.

European Gas Company, Ltd.—The Directors have decided to pay, on Sept. 30 next, an interim dividend of 2½%, free of income-tax. The interim dividend paid last year was at the same rate.

The Football Club of the Plymouth and Stonehouse Gas Company is making its first appearance this season in the senior section of the Plymouth and District League, while another team is entered for the junior section. The Club possesses at Longbridge what is probably the most commodious and up-to-date ground in the League, and under the direction of Mr. R. A. Lucas, and his assistant, Mr. L. Maddock, is expected to do well in its initial season.

Sir John Cass Technical Institute.—The new session of the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C. 3, which extends over about 36 weeks, will begin on Monday, Sept. 25, and students will be enrolled during the preceding week. The Institute provides instruction in fuel technology, including coal carbonization and gas manufacture; and full facilities are provided in well-equipped laboratories for special investigations and research. The requirements of students wishing to qualify for the Ordinary and Higher Grade Certificates in Gas Engineering are met by the special curriculum at the Institute, which has been approved by the Institution of Gas Engineers and the Board of Education.

Another Successful Cake-Baking Competition was held last week at the showrooms of the Hartlepool Gas and Water Company in connection with a series of cookery demonstrations. There were 99 cakes submitted, and Miss Edith Taylor, C.D.S. (of Messrs. Stoves, Ltd.), who judged the cakes, complimented the competitors on the quality of the entries.

Proceedings of the Junior Associations.—Reprinted from the "JOURNAL," the Transactions of the British Junior Gas Associations for 1932-33 is an imposing record of good work accomplished during a session characterized by papers of high technical standard and by lively and useful discussions. Nearly 500 pages of valuable information on all manner of subjects connected with gas manufacture and supply! The Junior Associations may justly be proud of their achievements in 1932-33 and of the position they occupy in the organization of the Gas Industry.

Renewed Confidence.—That the confidence of road transport operators in the future prosperity of their businesses under the new provisions of the Road and Rail Traffic Bill has been restored is evidenced by the large number of orders the Sentinel Waggon Works, Ltd., have recently received for their new lightweight shaft-driven solid-fuel burning steam road vehicles. So great is the volume of work now passing through their factory at Shrewsbury that an increased number of men is being employed in all departments, and the prospects of a busy autumn and winter are very encouraging.

New Retort Installation at East Hull.

On page 391 of last week's issue of the "JOURNAL," there was published a photograph of the pile driving plant in connection with the new Glover-West retort installation at the works of the East Hull Gas Company.

It should be mentioned that we were able to reproduce this picture by courtesy of the Hull *Daily Mail*.

THE NEWS—continued.

IMPORTANT.

Institution Canadian and United States Tour.

The members of the Institution of Gas Engineers and of the British Gas Industry visiting Canada and the United States of America will leave London (Euston) by Special Train at 9.15 a.m. on Friday, Sept. 8, and will sail from Liverpool (Landing Stage) at 3 p.m. that day on the SS. "Duchess of York."

Friends of passengers are invited to see the party off at London or Liverpool. Return tickets at reduced rail fares to Liverpool from London on the Special Train, or from other stations in Great Britain, may be obtained from Mr. P. K. Reynolds, Canadian Pacific Railway Company, 62, Charing Cross, London, S.W. 1.

Similar arrangements will be made in connection with the arrival of the MV. "Georgic" in Liverpool on Oct. 16, and application for tickets should be sent to Mr. Iden R. Reed, White Star Line, 1, Cockspur Street, London, S.W. 1.

TO CORRESPONDENTS.

Those who are likely to be corresponding with participants in the forthcoming visit should make note of the fact that letters sent from the British Isles and addressed to members at the official Hotels, or elsewhere *en route*, may not reach them if, for example, the Mail happens to arrive after the party has left or if the member has varied his arrangements. It will be safer and more expeditious to address letters in the following manner. Such letters will be immediately despatched from Montreal to the member wherever he may be, full use being made of the travelling representative of the Canadian Pacific Railway Company:

(Name)
c/o Tours Department,
Room 259,
Canadian Pacific Railway Company,
Windsor Street Station,
Montreal,
Canada.
I.Gas E. Tour.

Similarly, telegrams should be addressed:

(Name)
Gas Tour,
care Apatma,
Montreal.

TELEGRAPH FACILITIES FROM CANADA AND U.S.A.

Members of the Institution of Gas Engineers who are about to tour Canada and the United States of America will, we feel sure, be glad to know that they will be able to keep in touch with their friends and business associates through the medium of the "All-British Telegraph Service."

In Canada, Imperial and International Communications, Ltd., is also known as "Pacific Cable Board," and two cable circuits are operated direct from their Montreal Office to the Main Station, London. The Company do not, however, deal direct with the public, telegrams being collected and delivered through the intermediary of the Canadian Pacific Telegraph Offices.

The routing indication used in Canada for telegrams intended for transmission over the Company's cable system to all parts of the world is "Via Imperial."

All information can be obtained from the Company's Offices:

MONTREAL: 204, Hospital Street.
TORONTO: Room 915, Canadian Pacific Railway Building.
HALIFAX: Dennis Building, Granville Street.

In the United States of America, the Radio Corporation of America, Inc., operate in conjunction with the I. & I.C. a direct wireless service to London. The addresses of the R.C.A. Offices are as follows:

NEW YORK: 66, Broad Street.
BOSTON: 109, Congress Street.
WASHINGTON: 1112, Connecticut Avenue.
SAN FRANCISCO: 28, George Street.

In towns other than the above the Western Union Telegraph Company collect and deliver messages on their behalf. Telegrams intended for transmission by the joint R.C.A.-I. & I.C. wireless service should bear the routing instruction "VIA RCA."

Canadian Gas Association Convention.

The 26th Annual Convention of the Canadian Gas Association, to be held in Ottawa on Sept. 18 and 19, promises to be one of the best ever held in the history of the organization. We learn from Mr. G. W. Allen, Secretary-Treasurer of the Association, that the following "home" contributions will form part of the programme:

"Experience in House Heating with Gas," by JOHN KEILLOR, Gas Engineer, B.C. Electric Railway Company, Ltd., Vancouver.

"Purification of Gas by Otherwise Waste Ammonia," by JOHN D. PRICE, Superintendent, Montreal Coke and Manufacturing Company, Montreal.

"Investigations Conducted by the Fuel Research Laboratories of the Department of Mines, with a view to assisting the Gas and Coke Industry," by B. F. HAANEL and R. A. STRONG, Ottawa.

"Sewer and Manhole Explosions," by D. O. WING, Assistant Superintendent, Mains and Services Department, Montreal Light, Heat, and Power Corporation.

"Planning and Executing an Industrial Fuel Department," by O. L. MADDUX, Industrial Engineer, United Gas and Fuel Company, of Hamilton, Ltd.

"Reforming Natural Gas and Reforming Oil Refinery Gases," by J. A. PERRY, United Gas Improvement Company, Philadelphia.

Nuneaton's Claims.

Articles have been published in recent issues of the *Midland Daily Tribune* on "Home Petrol and Heavy Oil from Home Coal." These articles included references to the Nuneaton Gas Company's developments. "The Company," it was stated, "claims to be producing gas of 200 quality (with oil) at prices about one-third of the cost of rich gas when coke is sold at something like normal prices. It is the only gas undertaking in the country producing and supplying 200 gas. Incidentally, the whole of the gas and oil is made from Warwickshire coal.

"The question was asked on what ground the contention was based that 80,000,000 tons of coal could be gasified by gas undertakings, and sold in lieu of coal. Why, for example, if oil was the objective, could not the electricity people claim, with just as much right, the idea of gasifying 80,000,000 tons of coal and producing the oil needs of the country, and the use of gas for their boilers in the generation of the current? The answer was: 'There are no reasons against their so doing, but the fundamental ones.'

"We were asked to consider the following arguments:

"The source of both gas and electricity is coal. The Gas Industry carbonizes 17,000,000 tons of coal, and distributes, in gas, heat representing roundly 5,500,000 tons of coal, and heat in the form of coke and oil representing roundly 8,500,000 tons of coal, or together over 80% of the coal treated.

"The electricity industry uses 10,000,000 tons of coal, and distributes heat in the form of current representing roughly the heat in 2,000,000 tons of coal (reckoning 3412 heat units per unit of electricity) from it, or 20% of the coal treated."

Public Lighting at Margate.

Those who intend being present at the Conference of the Association of Public Lighting Engineers next week will be interested to know something of the lighting at Margate, since it has the reputation of being one of the best lighted seaside resorts in the country.

Nearly all the lamps employed are of Messrs. Wm. Sugg's manufacture. On the promenades and main roads will be seen the elegant upright "Rochester" lamp, in the smaller thoroughfares the "Windsor" lamp, and in the very large

number of shelters which Margate boasts, the "Littleton" suspension lamp.

As a matter of interest to those attending the Conference, and by permission of the Margate authorities, twelve of the upright "Rochester" lamps—situated in Ethelbert Road—have been fitted with Sugg's "Multi-Ray" reflectors, and a further six similar lamps on the Queen's Promenade—adjacent to the Queen's Highcliffe Hotel—with the K type "Directional" reflector. The two installations may be seen in the course of a few minutes' walk, the Queen's Parade being right on the front and Ethelbert Road leading directly off the front, a short distance towards the old town. An excellent opportunity is thus afforded to observe, by comparison, the remarkable improvement effected by either reflector, and also to judge the merits of the two types.

The "Multi-Ray" normally employs facets of silvered glass, while the "Directional" is of highly-polished rustless steel. Both produce a very big increase of candle-power at the useful angles without any increase in consumption, and therefore permit full compliance with the British Standard Specifications at extremely economical rates. An interesting booklet on the subject "More Powerful Street Lighting by Directional Reflection" may be obtained gratis from Messrs. Sugg, Ranelagh Works, Chapter Street, Westminster, S.W. 1.

It should perhaps be mentioned that Messrs. Sugg are also responsible for the flood-lighting of the Queen's Highcliffe Hotel and also of the War Memorial Gardens.

Old Silkstone Collieries, Ltd.

In the course of his speech at the annual meeting of Old Silkstone Collieries, Ltd., Sir Archibald Mitchelson, Bart., Chairman, explained that the result of the year's working, after debiting depreciation on rolling stock, interest on bank loan and on housing scheme capital, amounting to £10,328, shows a profit of £12,939, which increases the amount standing to the credit of profit and loss account to £99,485.

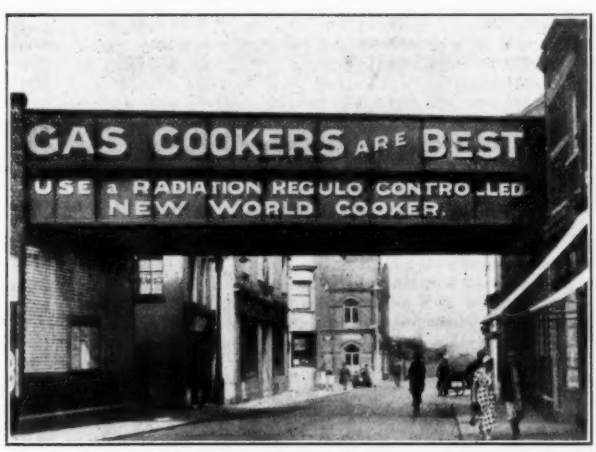
"We have experienced," he said, "another year of acute depression and difficulties in the mining industry. The returns of the industry in fact show that it has been one of the worst for some years past. As indicative of the uneconomic position, Yorkshire, which is regarded as being in a favoured position by its geological conditions and the excellent qualities of its coal, showed a credit balance on 1932 working of 5·21d. per ton only. Against this there falls to be placed certain debits of bank and debenture interest and other items, which are not taken into account in the ascertainment, which approximate 5d. per ton and which practically eliminates the credit balance. This is a deplorable position."

There had been some improvement in the value of chemical products from their coke ovens, continued Sir Archibald. The various qualities of their coal and their "Silko" coke nuts maintained their high market reputation, and they had a steadily increasing demand for their proprietary road material "Silkmac," which was now generally recognized as one of the premier and most durable road dressings. Their Subsidiary Colliery Companies had suffered from the general depression.

Sir Archibald remarked that he saw no reason why they should be despondent as to the future of the coal industry. Its troubles arose almost entirely from the difficulty of adjusting the widely varying and conflicting interests of the different coal-producing districts in this country on the disposal side. Surely this adjustment was not impossible of achievement if it was approached with a spirit of goodwill and mutual accommodation. On well ordered lines of co-operative endeavour the position of the industry could be materially improved without adding any unfair burden to the industrial or domestic user of coal. The general trend of industrial conditions was happily in an upward direction. The satisfactory decrease in the unemployment figures was practical proof of this.

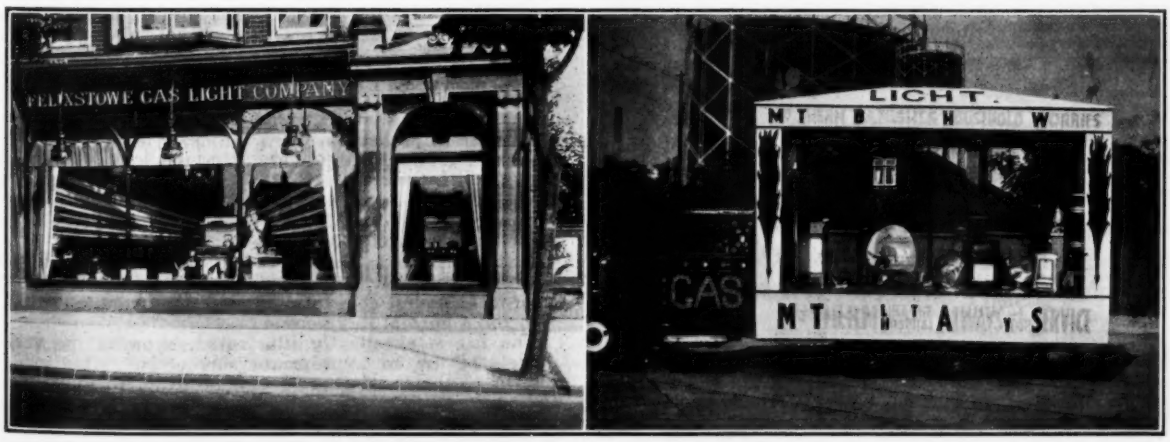
In conclusion, Sir Archibald said that the Directors were fully cognisant of the great hardship involved upon shareholders by the non-payment of dividends. They had substantial holdings in the Company, and they had foregone all fees due to them under the Company's Articles of Association since 1927. The same position applied where they represented shareholders' interests on the Boards of Subsidiary Companies.

Striking Advertising.



This photograph, forwarded by Mr. A. L. Morris, Accountant and Sales Manager to the Cheltenham and District Gas Company, shows how a railway bridge can assist in selling gas. The bridge in question is in Cheltenham's main street.

More Successful Propaganda



Our photographs are of a decorated lorry of the Ipswich Gas Light Company which won the first prize and challenge cup at Felixstowe Carnival, and the Company's Showroom Window which gained third prize at the same event.

THE NEWS—continued.

Particulars Relating to the Manufacture and Supply of Gas

By Authorized Gas Undertakings in Great Britain for the Year 1932

As Shown by the Board of Trade Return†

Year.	Number of Authorized Undertakings Included in Return.	Quantity of Gas. Made. Coal Gas.	Made. Water Gas.	Made. Total Made.	Sold. To Prepayment Consumers.	Sold. To Ordinary and Power Consumers, &c.	Sold. For Public Lamps.	Sold. Total Sold.	Length of Gas Mains.
		1000 C.Ft.	1000 C.Ft.	Million C.Ft.	1000 C.Ft.	1000 C.Ft.	1000 C.Ft.	Million C.Ft.	Miles.
1922	796	201,963,546	43,946,129	255,706*	78,224,063	146,174,788	8,203,938	232,603	40,231
1925	781	231,347,681	48,173,291	288,616*	92,747,287	163,059,081	9,950,985	265,757	43,178
1930	767	255,336,236	39,525,450	313,046*	107,964,634	170,737,354	11,288,866	289,991	50,218
1931	749	254,350,650	40,803,280	313,753*	110,510,440	168,394,815	11,787,528	290,693	51,807
1932	734	251,018,508	38,468,132	309 336*	109,974 360	164,883,077	12,130,576	286,988	53,156

Year.	Materials Used in Manufacture of Gas. Coal Carbonized.	Materials Used in Manufacture of Gas. Coke for Water Gas.	Materials Used in Manufacture of Gas. Oil.	Quantity of Residuals Made. Coke and Breeze.	Quantity of Residuals Made. Tar.	Quantity of Residuals Made. Sulphate of Ammonia.	Number of Consumers. Prepayment.	Number of Consumers. Ordinary.	Number of Consumers. Total.
	1000 Tons.	1000 Tons.	1000 Gallons.	1000 Tons.	1000 Gallons.	Tons.			
1922	15,907	1058	46,145	10,475	169,771	113,373	4,137,009	3,535,137	7,672,146
1925	17,031	1153	61,383	11,398	194,168	125,874	4,446,618	3,753,837	8,200,455
1930	17,669	790	49,073	11,913	214,762	125,443	5,354,547	3,989,287	9,343,834
1931	17,427	804	53,124	11,732	212,682	103,001	5,560,619	3,997,610	9,558,229
1932	17,001	746	51,749	11,416	211,010	75,728	5,783,449	3,989,566	9,773,015

* Including "Other Gas" and "Coke-oven Gas." † H.M. Stationery Office, Adastral House, Kingsway, W.C., and Branches. Price 4s. net, postage extra.

Coke Oven Gas Purchased by Gas Undertakings.

A Table in the Board of Trade Return for 1932 gives the quantities of gas which were bought from owners of coke ovens by authorized gas undertakings.

	1000 C.Ft.
ENGLAND AND WALES.	
Accrington District Gas and Water Board	569,802
Ackworth, Featherstone, Purston, and Sharlston Gas Company	45,979
Burnley Corporation	543,729
Castleford and Whitwood Gaslight and Coke Company	162,288
Chesterfield Corporation	161,195
Clay Cross Gas Company, Ltd.	83,426
Cleveland Gas Company	23,130
Derby Gas Light and Coke Company	705,532
Eckington and Mosborough Gas Company, Ltd.	36,000
Garw and Ogmore Gas Company	25,669
Haslingden Union Gas Company	36,938
Houghton-le-Spring District Gas Company	83,491
Kidsgrove Gaslight Company	55,030
Middlesbrough Corporation	1,137,438
Newcastle-upon-Tyne and Gateshead Gas Company	2,636,270
Nottingham Corporation	703,770
Ossett Corporation	139,478
Pontypridd U.D.C.	170,649
Rawmarsh U.D.C.	81,833
Rhymney and Aber Gas Company	281,408
Rotherham Corporation	797,455
Royston and Brodsworth Gas Company	114,373
Sheffield Gas Company	5,130,086
South Yorkshire and Derbyshire Gas Company	154,065
Stocksbridge Gas Company	53,782
Sunderland Gas Company	409,784
Swinton and Mexborough Gas Board	141,978
Tudhoe and Sunderland Bridge Gas Company	17,862
Wath, Bolton, and Thurnscoe Gas Board	102,417
Wombwell U.D.C.	112,270
Worsbroughdale and Worsbrough Gas Light and Coke Company, Ltd.	31,109
SCOTLAND.	
Glasgow Corporation	693,251
Total	15,441,487

COMPARATIVE FIGURES.

Year.	Number of Purchasing Undertakings.	Quantity of Coke-Oven Gas Bought.
		1000 C.Ft.
1921	14	1,325,027
1925	21	4,797,752
1930	32	13,201,351
1931	31	13,923,456
1932	32	15,441,487

Coke Oven Gas for Glasgow.

Gas Committee's Decision.

The Gas Committee of the Corporation of Glasgow, at their meeting on Aug. 22, considered the offer, made by Messrs. Wm. Baird, of Gartsherrie, Lanarkshire, to supply coke oven gas to Glasgow. This offer, which provides for a daily supply of about 6,250,000 c.ft. at a price of 8d. per 1000 c.ft., was considered in a report submitted by Mr. J. W. McLusky, the Glasgow Gas Manager. While this meeting was of a private nature it is understood that Mr. McLusky's chief criticism was that the saving to be effected by the offer was more apparent than real. Mr. McLusky believes that Messrs. Baird's calculated saving of £44,000 would amount in reality to only about £6600 when consideration was taken of the fact the oncost burden to be carried by the Corporation, working on a smaller output, would be almost unchanged. Plant would have to be kept in reserve to cope with peak demands, as the proposed offer amounts to about one-fourth of the normal summer output and one-seventh of the winter.

The Committee, after considering Mr. McLusky's report and a letter from Messrs. Baird setting forth their proposal, decided, by ten votes to eight, to recommend that the Town Council reject the offer. The minority, however, requested that the minute should be left open for further consideration by the Town Council, and it is possible that the matter may be referred to a special sub-committee for further report.

Gas-Coke Fires.

An attractive list has been published by Messrs. C. H. Kempton & Co., Ltd., of 72, Bennerley Road, S.W. 11, dealing with their Kaye coke fires. These fires, which embody gas ignition, are highly efficient, and the range of design is wide. The fires are fitted with a rocking bar grate—a most useful feature.

Tests carried out have proved that a 14-in. Kaye fire costs less than ½d. to ignite with gas, and burns 18 lbs. of coke in 12 hours, at a total expense, on average figures, of 4½d. for a normal day's use.

The list is excellently illustrated, showing the various models of fire in appropriate surrounds. One model—known as the "Adapter"—can be fitted to any existing surround, whether iron or tiles; another pattern is suitable where a back boiler is already fixed; and there are basket models for recessed fireplaces, and also an "independent" fire which does not require a fireplace.

The entire range of Kaye fires may now be obtained in "Kembright"—a pleasing finish which will not rust.

CARBURETTED-WATER-GAS AS A COAL-GAS AUXILIARY - -

By
Humphreys & Glasgow, Limited.

AN APPRAISAL OF FINANCIAL BENEFITS OF CARBURETTED-WATER-GAS IN GREAT BRITAIN, WHICH ARE NOT DISCLOSED IN USUAL SYSTEMS OF ACCOUNTING.

(*Concluded from p.* 397.)

PART II.

"Reflex" Effect of Carburetted-Water-Gas on the Gas-Coal and Residuals Markets.

No attempt is made to gauge many well-known but indeterminate collateral advantages of Carburetted-Water-Gas; but its "Reflex" Effect on the purchase of Gas-Coal and on the sale of Gas-Coke and Gas-Tar is of an importance which challenges ready belief.

The following indication of these Reflex Benefits of Carburetted-Water-Gas is based on the latest Board of Trade figures available.

The Board of Trade Returns for Great Britain give for the year 1931:

Coal Gas made	254,350 650,000 c.ft.
Water-Gas made (16% on Coal-Gas or 14% of Coal-Gas + Water-Gas)	40 803,280,000 ,,
Gas-Coal carbonized	17,427,000 tons
Gas-Coke used for Water-Gas	804,000 ,,
Gas Oil used	53,124,000 galls.
Tar made (Coal and Oil)	212,682,000 ,,

The above figures yield by calculation—

Salable Gas-Coke (at 9 cwt. per ton of coal)	7,842,150 tons
Oil-Tar (at 15% on Gas-Oil)	7,968,609 galls.
Coal-Tar (by difference)	204,713,400 ,,

These Returns show an average of 1·3 gallons* of oil per 1000 c.ft. in the Water-Gas, which means a calorific value of about 420 B.Th.U. per c.ft., and a total of 171,373,776 therms in the year's Carburetted-Water-Gas. At the rate of 73 therms of Coal-Gas per ton of coal carbonized, the extra gas-coal required to replace the Water-Gas would be 2,347,590 tons, or 13·5% on the gas-coal actually used in 1931.

If, therefore, no Carburetted-Water-Gas had been made during 1931, the consumption of gas-coal and production of gas-coke and coal-tar would have risen 13·5%, and the above total quantities would have been increased as follows:

Gas-Coal	by 2,347,590 tons	to	19,774,590 tons
Gas-Coke for Sale	,, 1,056 416 tons	,,	8,898,566 ,,
Coal-Tar	,, 27,576,942 galls.	,,	232,290,342 galls.

To the above increase of 1,056,416 tons in gas-coke for sale would be added the quantity of coke used for manufacturing Water-Gas, namely, 804,000 tons; making a total increase in gas-coke to be sold of 1,860,416 tons or 26½%.

The extent to which the prices of gas-coal and residuals are affected by the manufacture of 14% of Carburetted-Water-Gas (as in 1931) is difficult to estimate; but, if Carburetted-Water-Gas (providing the only alternative to the use of gas-coal) were eliminated, thus not only increasing the demand for gas-coal (in 1931) by 13½%, but also giving it a monopoly of the Gas Industry, its cost would rise correspondingly; while the increase of gas-coke for sale by 26½% (as in 1931) would collapse coke prices.

Each decrease of half-a-crown per ton in the selling price of gas-coke would equalize the addition of 6·54d. per 1000 c.ft. to the cost of the Water-Gas; or would decrease the year's value of the gas-coke by £1,112,320.

Likewise, each increase of 1s. per ton in the cost of gas-coal would compensate, on the above 1931 figures, an addition of 5·82d. per 1000 c.ft. to the cost of the Water-Gas; or would increase the year's cost of gas-coal by £988,730.

Similarly, each decrease of ½d. per gallon in the selling price of coal-tar would equalize the addition of 2·84d. per 1000 c.ft. to the cost of the Water-Gas; or would decrease the year's value of the coal-tar by £483,938.

The total gas-oil used in Great Britain in 1931 was 53,124,000 gallons. The new Duty of 1d. per gallon on this total quantity amounts to £221,350. On the other hand, the "Reflex" Benefits of Carburetted-Water-Gas indicated above (which are independent of the price of oil) were possibly *ten times this total Duty of* £221,350!

Furthermore, the foregoing assumes a proportion of Carburetted-Water-Gas in all town-gas made in Great Britain, whereas the use of Carburetted-Water-Gas is far from being general in British gas-works. Those Gas Undertakings which use Carburetted-Water-Gas make much more than this National 1931 average of 14%; therefore, its actual effect on their coke markets, which are largely local in character, is correspondingly greater. To a less extent, their gas-coal and tar markets may be likewise favourably influenced.

Apart, however, from these great REFLEX BENEFITS, Conclusion 4 to Part I. shows that—

Excluding Capital Charges, PEAK-LOAD Carburetted-Water-Gas is cheaper to manufacture than Coal-Gas *per se*. This Manufacturing Cost for Carburetted-Water-Gas could reach 27·01d. per 1000 c.ft. (32·67 − 5·66 Capital Charges for C-W-G.), or *nearly double its actual cost* of 14·30d., before its *Direct* Savings disappear—the full *Reflex* Benefits still remaining unchanged; although it pays for coke an enhanced price *which it creates*, bears the cost of "peak-loads," dilutes or enriches as desired, accurately maintains the town standard of quality, and provides many well-known but indeterminate Collateral Advantages!

In view of all these circumstances, it goes without saying that the production of Carburetted-Water-Gas in Great Britain should be greatly increased. Therein, moreover, lies the perfect solution of the Coke Problem, which must otherwise remain a crucial coal-gas problem, so long as the chief products of coal-gas manufacture—Gas and Coke (the coke production having no relation to the demand for coke, but depending solely on the demand for gas)—are competing for substantially the same domestic uses.

PART III.

The Permanence of the Advantages of Auxiliary Carburetted-Water-Gas from its Introduction to the Present Time.

The FIRST INSTANCE to be cited is naturally the Gas Light and Coke Company, who first began the permanent manufacture of Carburetted-Water-Gas in the United Kingdom at Beckton in 1891. This original trial Plant has grown until their Beckton Installation now comprises Labourless Carburetted-Water-Gas Plant with a daily capacity exceeding 40 million c.ft.

Moreover, the aggregate capacity of Carburetted-Water-

* *Important Note.*—The widespread belief that one therm is the yield in gas per gallon of gas-oil is a grave misconception. The usual yield is 1·25 therms per gallon of Oil. This error is due primarily to ignoring the volume of oil-gas, which is 70·75 c.ft. per gallon, and to the secondary assumption that the calorific value of commercial Blue-Water-Gas is 300 instead of about 290 B.Th.U. To illustrate: Carburetted-Water-Gas (Part I.) using 2 galls. of oil per 1000 c.ft. has a calorific value of 500 B.Th.U., while the calorific value of the original Blue-Water-Gas is 290 B.Th.U. At the lesser volume of 70 c.ft. per gallon, 1000 c.ft. of this Carburetted-Water-Gas (with a total heating value of 500,000 B Th.U.) contains 860 c.ft. of Blue-Water-Gas and 140 c.ft. of Oil-Gas. The 860 c.ft. of Blue-Water-Gas at 290 B.Th U. has a total heating value of 249,400 B.Th.U. This leaves 250,600 B.Th.U. for the 140 c.ft. of Oil-Gas from 2 galls. of oil—being 125,300 B.Th.U., or just over 1·25 therms, per gallon of oil.

Gas Plant at their other Manufacturing Stations now exceeds that of the Beckton Installation, being 56 millions daily.

Some of the benefits which have led the Gas Light and Coke Company to manufacture Carburetted-Water-Gas on this huge scale have been described by their Chief Engineer in evidence before a Government Committee—see "GAS JOURNAL," Dec. 11, 1929.

In further practical evidence of the PERMANENCE of the benefits of Auxiliary Carburetted-Water-Gas, the following SECOND and THIRD INSTANCES span an interval of nearly Forty Years:

The SECOND INSTANCE (from Mr. Glasgow's original Paper) shows the financial results following the installation at Belfast of the earliest Humphreys-Glasgow Plant in the United Kingdom—

"Before the installation of Carburetted-Water-Gas Plant, the cost of manufacturing coal-gas at Belfast was 13·35d. per 1000 c.ft., and the greatest year's profit ever yielded by the Undertaking was £23,000. During the first year, making but 20% of Carburetted-Water-Gas at a cost of 13·324d. per 1000 c.ft., the profit rose to £34,000.

"This anomaly is explained by the fact that the collateral and reflex advantages of water-gas manufacture reduce the cost of the coal-gas to 11·428d., making the entire output average 11·869d. per 1000 c.ft.

"During the next year, 27% of water-gas was made, at a cost per 1000 c.ft. of 12·054d., and the annual profit was £55,000; resulting in a reduction in selling price of 3d. per 1000 c.ft.

"The Engineer attributed four-fifths of this gain to the use of Carburetted-Water-Gas. If the saving in capital charges, compared with coal-gas plant of similar capacity, had been added to the above manufacturing profit, the result would have been far more astounding!"*

The THIRD INSTANCE (separated by nearly forty years from the foregoing Example) covers the past year in the Croydon District; Croydon being chosen because it approximates the size of the Example dealt with in Part I., and is equipped with equally modern Coal-Gas and Carburetted-Water-Gas Plants:

Excluding Capital Charges, for which comparative figures are not available, the general results of the Croydon Gas Company in 1932 were—

—	Coal-Gas.	Carburetted-Water-Gas.
Annual Production (c.ft.)	2,253,394,000	998,582,000
Calorific Value (B.Th U.)	542·8	415·7
Holder-Cost per 1000 c.ft.	16·05d.	10·4d.
Holder-Cost per Therm	2·96d.	2·5d.

The Coal-Gas of 542·8 B.Th.U. was 5·65d. (or 54%) dearer per 1000 c.ft., and 0·46d. (or 18%) dearer per therm, than the Carburetted-Water-Gas of 415·7 B.Th.U.; although the Carburetted-Water-Gas Plant provided invaluable "peak-load" advantages, and also most efficiently diluted the Coal-Gas to, and accurately maintained, the desired standard of town supply.

Adding 1d. per gallon to the price of the oil would bring the Revised Croydon Costs of the Carburetted-Water-Gas to 11·62d. per 1000 c.ft. and 2·79d. per therm. In other words, with the full new Duty added to the price of oil, "Base-Load" Coal-Gas throughout the year 1932 would have cost Croydon over 6% more per therm than the "Peak-Load" Carburetted-Water-Gas.

Since these Revised Costs are more favourable to Carburetted-Water-Gas than the "Example" in Part I., the saving set forth in Part I. would be correspondingly increased, if the actual Croydon results, *plus* one penny per gallon of oil, were substituted for the corresponding "representative" costs in Part I.

In ADDITION, there would, of course, be the great "Reflex" Benefits indicated in Part II.

In General Conclusion, it may be again emphasized that no one is asked to accept, for local application, the precise figures in this Treatise. Each case must be gauged by its own peculiar conditions. But, with the relative capacities and outputs described, the benefits, *ordinarily undisclosed*, of "Carburetted-Water-Gas as a Coal-Gas Auxiliary" will be broadly as disclosed herein.

* For the year ended March 31, 1933, at Belfast, with 29% of Carburetted-Water-Gas, the Domestic Rate was 2s. 2d. and the Industrial Rate 1s. 10d. per 1000 c.ft.; and the year's profit of the Belfast Gas-works was over £136,000.

North British Association

The Seventy-Second Annual General Meeting of the North British Association of Gas Managers will be held in the George A. Clark Town Hall, Paisley, on Thursday, Sept. 7, under the Presidency of Mr. A. S. Nisbet, Gas Engineer and Manager to the Paisley Corporation.

The proceedings will begin at 10 a.m., when a welcome to the Burgh of Paisley will be extended by Provost James Galt. Following the presentation of certificates, the William Young Memorial Lecture will be given by Dr. F. S. Sinnatt, Director of Fuel Research. During the afternoon a paper on "Trade Waste from Gas-Works" will be read by Mr. Alexander MacDonald, of Motherwell and Wishaw. In the evening a civic reception will be held in the Town Hall.

On the Friday there will be an excursion to Arran on the "Duchess of Argyll"—a cruise which affords scenery of exquisite beauty.

On the Wednesday before the meeting a Ladies' Golf Competition will be held on the Whitecraigs Course, and a Gentlemen's Competition on the Killermont Course. A Bowling Competition will take place on Wellmeadow Green, Paisley.

THE ANNUAL REPORT.

In the Annual Report for 1932-33, it is mentioned that Mr. Lewis Bain, of Cullen & Banff, has been appointed to represent the Association on the Council of the Institution of Gas Engineers for the year 1933-34.

In regard to the Commercial Section (Western District), while no outstanding event falls to be recorded, the interest of members was maintained. The exchange of opinions and information was very helpful, and members kept themselves abreast of all pertaining to the commercial side of the Industry. Supplies of coal were regular and plentiful, and no anxiety was experienced during the winter. The seasonable weather in the early spring and a slightly increased industrial demand made for easier disposal of coke, and undertakings generally had been enabled to clear their yards. The expected increase in returns for tar was not realized, and other bye-products show little sign of betterment.

By courtesy of Airdrie Town Council the October meeting was held there, and afterwards members visited the Airdrie Sewage Purification Works. Interest in this visit is attached to the fact that all gas-works effluent passes into town sewers without any deleterious effect to the bacteria in sewage purification works.

Special subjects discussed were Street Lighting, Insurance of Meter Collectors, Responsibility for damage to meters on consumers' premises, and Flood Lighting.

During the year five meetings of the North-Eastern District Commercial Section were held—two at Dundee, two at Perth, and one at Monifieth.

Gas charges came in for a considerable amount of discussion at several meetings, and much useful information was obtained and circulated. One of the members raised the question of circulating Monthly Returns of Gas Coke exported. This matter was dealt with, and along with other useful information circulated on the Monthly Returns. The tonnage and price of gas coke exported is now given monthly not only as regards the United Kingdom, but also for Scotland: and this will prove of considerable value to those interested in export of coke.

The Rules, which had been in existence since the inception of the Section, have been revised and brought up to date.

EDUCATION SCHEME—SCOTTISH DISTRICT COMMITTEE.

During the past year the Committee has consisted of the following members:

Representing the North British Association of Gas Managers—H. H. Gracie, Edinburgh; David Fulton, Helensburgh; A. S. Nisbet, Paisley; Archd. Kellock, Airdrie.

Representing the Scottish Junior Gas Association—Western District—James Hall, Provan; Sam. M'Gown, Dalmarnock.

Representing the Scottish Junior Gas Association—Eastern District—Arthur Doran, Granton; D. Warden, Dundee.

Representing the Central Institutions—Principal J. C. Smail, Heriot-Watt College, Edinburgh.
Representing the Scottish Education Department—W. Hyslop, H.M.I.S., Glasgow and West of Scotland.

The numbers of applications approved for admission to 1933 Examinations of the Institution of Gas Engineers were as follows:

	1933.	1932.
Gas Engineering—		
Ordinary Grade	11	14
Higher Grade	8	13
Gas Supply—		
Ordinary Grade	13	9
Higher Grade	0	0

Three students were accepted by the Gas Education Committee for the Diploma Examination in Gas Engineering.

Attention, it is stated, must again be directed to lack of interest taken in the Higher Grade Supply Certificate. It seems a little strange that young men are so little perceptive of the opportunities afforded by the distribution side of an Industry which is crying out for well-trained men of the proper type.

Arrangements were made as last year for the examination in ancillary subjects of external students. The number of external students examined in ancillary subjects showed an increase on the previous year's figures, and there is a suggestion that more students in the unfavourable geographical areas are taking interest in the Scheme.

The number of students attending the Gas Courses in the various Colleges were:

	Gas Engineering.	Gas Supply.
Royal Technical College, Glasgow	19	17
Heriot-Watt College, Edinburgh	10	18
Dundee Technical College, Dundee	13	13

It is matter for satisfaction that last winter it was possible to resume Gas Supply Classes at Dundee.

The number of students at all classes is almost the same as a year ago.

The Gas Industry in the Dominion of Canada*

By H. M'Nair, President of the Canadian Gas Association; Manager of the Winnipeg Gas Undertaking.

Only five years now remain to complete the century of Canada's manufactured Gas Industry. The introduction of gas into the Dominion in 1838 provided the streets of Montreal with a novel illuminant, and presented the officials of the pioneer Company with a pretty problem in the shape of a meterless distribution system. Difficulties arose then which might well have killed a less vigorous Industry in its infancy. Instead, the scope of its activities travelled rapidly westwards, constantly expanding, until gas service was enjoyed over the entire 3500 miles spread from coast to coast. Toronto adopted gas in 1841, Halifax (Nova Scotia) in 1843, Quebec in 1849, and Winnipeg in 1883.

Probably no part of this long and honourable period of service has been more fraught with retarding influences than the last decade. Canada ten years ago had a population of approaching 9 millions. To-day the figure reaches 10½ millions. Looking for a corresponding increase in total gas sales, one finds that the 12,500,000 million c.ft. of 1923 has grown to 17,500,000 millions, and the capital now invested in the 38 gas undertakings of the Dominion is estimated at £12,000,000. These results have been achieved in direct competition with the world's cheapest electrical energy.

Records at Winnipeg show that in 1905 the cost of electricity, which was then generated by steam, was 20 cents per KW.H. The Winnipeg Electric Company built their first hydro-power plant in 1906 on the Winnipeg river, 67 miles east of the city. The cost of current was dropped to 10 cents per KW.H. In 1911, the municipal hydro plant at Pointe du Bois was built and put into operation, with a corresponding further reduction of the electricity rate to 7½ cents per KW.H. In a very short time it was dropped to 3½ cents, and to-day, for domestic consumption, electric current is offered at nine-tenths of a cent per KW.H. As the harnessing of Canada's abounding natural water-power resources has developed, until in some cases electricity is now available at as low a rate as ½d. per KW.H., the gas side has not merely held its own but has continued to gain new ground. The prestige of gas throughout the world has been enhanced by its magnificent stand against an ever-increasing menace.

Typical of the policy adopted to meet this situation is our experience at Winnipeg. Due to a very intensive campaign in 1924 for selling electric power for domestic cooking purposes by the City of Winnipeg Municipal Hydro Electric System, electric ranges supplanted gas ranges in apartment blocks and homes to an extent which represented a decrease in gas sales to the amount of 60 million c.ft. annually. However, coincident with this campaign the Company concentrated on the sale of gas for industrial purposes, and within 18 months the loss accruing from the domestic demand had been more than made up, the increase in industrial fuel alone approximating 72 million c.ft.

Gas-works are already established in all the principal towns of the Dominion, and soon many of the smaller towns will be similarly equipped. Concessions have recently been granted for the building of new works by a number of local authorities. In other cases long-distance mains are now being laid for the supply of gas from central plants to surrounding villages. The number of gas consumers throughout Canada has grown from 370,000 in 1923 to 500,000 at the present time.

Factories Closed Down.

Added to the intensive competition of electricity and oil fuel has come the acute trade depression of recent years. Many Canadian works and factories have been compelled to close down. This has tended to arrest the usual upward curve of annual gas output, though to an extent which, spread over the various gas-works of the Dominion, represents a comparatively small individual margin. Mr. G. W. Allen, Secretary of the Canadian Gas Association, believes that the Gas Industry in Canada has suffered less from the prevailing trade depression than any other branch of industrial activity.

Great strides have been made here in linking manufactured gas with an infinite variety of industrial processes. No longer than 15 years ago there were 2000 known applications of gas fuel to industry. To-day there are 21,000, and the number is steadily increasing. Canadian gas undertakings now provide special facilities for their employees to study the technics of gas combustion, so as to have available an adequate staff of trained men to demonstrate the economies which this source of heat and power can effect as an industrial fuel. At Winnipeg, in 1929, the gas sales were greatly augmented due to the establishment of the Mid-West Glass Company, a Company for manufacturing bottles of various kinds. Their plant was erected in the Company's old retort house. Two glass ovens were installed and equipped for burning unpurified gas. The daily consumption of gas for one oven averaged 500,000 c.ft. The business of this new customer necessitated the erection of a 3½ million capacity carburetted water gas plant to take care of the glass plant and also to provide for a future industrial expansion. The total gas manufactured for this year amounted to 719,350,000 c.ft.

Although gas first came into use in Canada as a lighting agent, the adaptability of the Industry to changing conditions has been thoroughly tested since, and now in this land of extreme cold and heat the cooking and heating loads are the mainstay of the Industry. A notable improvemet in gas cooking stoves and in water heaters during the past five or six years has given a noteworthy impulse to their use, while there is also a rapid increase taking place in the number of domestic gas-operated refrigerators, each new one of which is estimated to add 20,000 c.ft. per household to the aggregate annual consumption.

Principal Undertakings.

In support of the increase of manufactured gas consumption in the Dominion of Canada during the last decade, given at the outset of this article, the progress of several of its principal undertakings over the same period is a sound guide to the strength of the Industry's position. Sales in Toronto have increased from 5126 million c.ft. in 1923 to 5927 millions to-day; in Montreal, from 3973 to 5838 millions; in Vancouver, from 511 to 1160 millions; and in Hamilton, from 120 to 1143 millions.

The splendid record achieved by the manufactured Gas Industry in Canada in recent years, and the continued progress during trying times like the present, leads one to anticipate the future of this great Industry with the utmost confidence.

*From the Summer Number of *West's Gas*.

The Gas Industry in Argentina*

By P. Ashley Cooper, Chairman of the Primitiva Gas Company of Buenos Aires, Ltd.

In a new country such as Argentina, progress is rapid. Events move quickly, new ideas are rapidly absorbed, and violent changes occur in industrial as well as in political fields. In these circumstances, history makes big strides in thirty or even twenty years, and in this respect the Gas Industry is no exception to the rule.

The Primitiva Gas Company, supplying the city of Buenos Aires, is the oldest and most important gas undertaking in Argentina, and is now the only one supplying this large city of over two million inhabitants. The Primitiva Company has had a long life dating back to 1855. It suffered many vicissitudes before developing into the well-organized public utility company which it is to-day. The original undertaking passed into the hands of the French some years after it was formed, and subsequently a British company took it over about 1900. Gas was a popular investment about that time, so much so that no fewer than five different companies were in existence in Buenos Aires in 1890. The political upheaval of that year was indirectly the cause of the amalgamation of two of five of these companies, and some ten years later a further amalgamation reduced the number to three.

During the ten years in which the city was supplied by the three companies, progress was considerable. The electricity supply at that time was disorganized and, like gas, was supplied by several competing companies. Under these conditions, gas held its own for many years for public and private lighting. The amalgamation of the three remaining gas companies took place in 1910, and then commenced a period for which prosperity was predicted. Argentina was exploiting its enormous agricultural resources, and relative tranquillity reigned in political circles. Prosperity, however, was not destined to last, and in 1914 the Company began to suffer both from lack of coal due to war conditions and from the fact that the Company's concession at that time did not allow the price of gas to be increased in order to cover the rise in the cost of combustibles. As the years of the war passed, supplies of coal, even at a fabulous price, ceased. An inadequate supply of gas was maintained with immense difficulty, by the carbonization of wood, maize, grass, bones, and any carbonaceous material the country could supply. This unfortunate period between 1915 and 1920 almost proved the ruin of the Company; but after long and tedious negotiations the present concession was obtained. The consumption of gas in the city had dropped from 2500 million c.ft. in 1913 to 1217 million c.ft. in 1922. Public and even private lighting had been entirely lost to the electric supply companies, which were by this time highly organized. There remained, however, an immense field for domestic cooking and industrial application, and with a view to developing these fields, a thorough re-organization was initiated by the present Board and Management in 1926.

Anticipating large increases in output, the Directors decided completely to modernize the manufacturing plant and to concentrate all gas production in one works. An installation of Glover-West continuous vertical retorts was erected, capable of producing 3½ million c.ft. per day, and this was followed some two years later by a further installation with a daily capacity of 5 million c.ft. Water gas plant, to produce 3 million c.ft. per day, was added in two separate units, purifiers were erected, the existing holders were repaired, and a new one was erected. Coal handling and transport were re-organized on the most modern lines.

In the meantime the sales and commercial organizations were taken in hand, and these departments were completely re-organized to undertake a drive, the results of which it was foreseen would soon absorb the producing capacity which had been prepared. The lack of suitable personnel in the country to undertake this extensive scheme was evident from the outset. There was a rapid response to the Company's propaganda, and a shortage of technical officers and skilled labour quickly became acute. The additional superior personnel were appointed almost entirely from the United Kingdom, but skilled labour was obtained by training local workers. A technical school, including a fitters' branch, was inaugurated, and, thanks to the intelligent labour available, the Company was not long before it had at its disposition a staff fit to cope with the extensive programme which lay before it.

Increases in production of 235 and 311 millions, representing percentages of 14 and 16 during 1929 and 1930, fully justified expectations. The organization was now getting into its stride, and these figures would have been exceeded in subsequent years but for the effect of the world crisis, which is now just as serious in Argentina as anywhere else. Naturally, the increase of 30,000 to 40,000 tons in the consumption of prime materials produced a serious problem in the sale of additional residuals and bye-products which were thrown on to a market already thought to be saturated. New outlets for these residuals had to be found. The additional coke had to be disposed of, and new uses for tar and pitch and their derivatives had to be created. All these problems have been successfully handled.

The campaign described above met with some difficulties, but the results obtained are extremely gratifying and sufficient to prove that gas has at last taken its place as a prime necessity of to-day's social life in Buenos Aires. Once normal conditions return we are confident that we shall again go ahead at a rapid rate.

Although the advantages of gas are now becoming recognized and appreciated in the city of Buenos Aires, this is not yet the case in many of the large towns of the Argentine. Only a few important towns possessed of a port for ocean-going steamers have, or have had, gas. These include Rosario (500,000 inhabitants), Bahia Blanca (100,000), La Plata (180,000), and S. Nicholas (26,000). Costly railway transport of coal and the difficulty of disposing of residuals in a semi-tropical climate have been the main causes which have contributed to prevent the development of gas in the large towns of the interior.

Although the use of gas in Buenos Aires is at present largely restricted to domestic uses, the value of gaseous fuel in industry has been clearly demonstrated by us with satisfactory results. But coal gas has a keen and vigorous competitor in petroleum and its products. Oil is available in large quantities in Argentina, and petroleum fuels are now being developed rapidly in the country.

These national products include natural gas, refinery gas, propane and butane in the gaseous state, and, of course, fuel oils. In view of new developments in the petroleum industry in Argentina, it is difficult to forecast the future. It would appear that in the case of this Company, and perhaps of other undertakings similarly situated in other countries, we must be ready to modify our ideas regarding gas manufacture. We must not neglect to utilize materials which, although they may appear unsuitable at present, may by their adaptation to our Industry prove to be economical, and at the same time satisfy the aspirations of the nations we serve.

It has always been the policy of the Primitiva to carbonize British coal. But Great Britain is not the only source available. Excellent gas coals are to be obtained from the United States at economic prices, while recently the Chilean coal producers have been able to offer their highly bituminous coals (43% volatile matter) at competitive prices.

I wonder whether our people connected with the British mining industry appreciate that every time they threaten each other with strikes or lockouts (an actual strike or lockout is not necessary) we are forced to protect our supplies and to place coal contracts outside the United Kingdom. Our obligation is to maintain a supply of gas, and our consumers are not concerned with internecine quarrels in the British coal industry. Companies operating abroad must adopt this policy. What is the cumulative effect of these strikes and rumours of strikes upon the export trade of the British mining industry?

* From the Summer Number of *West's Gas*.

GAS-WORKS EXTENSIONS IN THE ISLE OF WIGHT

New One Million C.Ft. per Diem Horizontal Plant at the Shanklin Gas Company's Works

Having not long since acquired the Undertaking of the Ventnor Gas and Water Company, the Shanklin Gas Company have completed an extensive scheme of alterations and additions to their carbonizing and ancillary plant, with a view to the more economical working of the joint concern.

The Engineer, Manager, and Secretary of the Shanklin Company is Mr. Frank C. Taylor, who has had more than fifty years' association with the Undertaking; so that the story of his career is the story of the progress of the Company with which he has been concerned so long.

Born in 1855 at Twyning, near Tewkesbury, Mr. Taylor was educated at the Abbey School, Tewkesbury, and was apprenticed in 1869 to Messrs. Collins & Cullis, cathedral and church builders. He was in the art metal and ironwork department, and his knowledge of building stood him in good stead ever since, enabling him to carry out building work without the services of contractors. After continuing with this firm for two or three years following the completion of his apprenticeship, he removed to Bath, and succeeded to a position in the distribution department of the Bath Gas Light Company.

Mr. Taylor's association with Shanklin dates back to the year 1881. Up to that time the Shanklin Gas Company was in low water, the output of gas only amounting to some 5 million c.ft. per annum. The Company managed to pay small dividends, and the price of gas was 6s. 11d. per 1000 c.ft. The late George Garnet, M.Inst.C.E., a President of the original Gas Institute, who had been called in by the Company as Consulting Engineer, recommended the appointment of a man capable of re-organizing the works, and Mr. Taylor was selected by him for the position. In the year following his appointment Mr. Taylor was elected a member of the Gas Institute.

Re-Organization.

He soon got to work preparing plans for the re-organization of the works—in fact, re-modelling the whole place. At first the task was an uphill one, and for two or three years it was necessary that progress should be made with much care and discretion; but Mr. Taylor soon gained the confidence of his Directors, and he found they were in hearty agreement with his suggestions and plans for future development.

The first notable addition to the works was the making of a siding at the railway yard to lessen the cost of the delivery of coals. A large tubular chute was constructed, enabling coals to be delivered direct from the level of the railway station into the works below. This reduced the price of coal by 1s. per ton, and in 1884 the price of gas was reduced to 5s. 10d. per 1000 c.ft.

For the next three years Mr. Taylor devoted himself to experimental and research work in association with the late Mr. F. W. Hartley, and adopted the purification of gas by the Cooper coal-liming process—which, however, did not prove a success.

In 1886 a new gasholder was added, capable of storing 25,000 c.ft., while in 1890 a still larger one was erected with a capacity of 125,000 c.ft. In 1926 another of 250,000 c.ft. was erected. The various works plant was either remodelled or re-built to such an extent that there is now scarcely a particle of the equipment in use that did duty when Mr. Taylor succeeded to the management.

When Mr. Taylor took charge the capital of the Company was £7000, and the annual make 5 millions. Now the capital is £79,000, and the annual make, according to the most recent available figures, is roughly 114 million c.ft. Then the consumers numbered less than 300; to-day the undertaking serves a population of some 10,000 persons, of whom something over 3500 are consumers, supplied through over 38½ miles of mains. The sales last year reached more than 105 millions, showing a consumption per consumer of about 30,000 c.ft. The coal carbonized amounts to rather more than 6600 tons a year.

It was upon the death of Mr. W. Sutherland, the Secretary, in 1892, that Mr. Taylor was appointed to the dual office of Secretary and Manager, and there has been uninterrupted progress in every department of the Company's operations ever since. In 1907 the Company obtained their Act of Parliament. Mr. Taylor is a member of the Southern Association of Gas Engineers and Managers. He is held in high esteem by the Directors and staff of the Shanklin Company generally, and on the completion of his half-century of service with the Company he was made the recipient of a chiming clock by the employees, and a divan chair by the Directors.

The New Plant.

Messrs. Aldridge & Ranken, Ltd., of 39, Victoria Street, S.W. 1, were the chief contractors and designers of the new plant, which includes a steel-framed retort house, bracings for the bench, an installation of Congdon standpipes, complete coal-handling plant, Fiddes-Aldridge charging machine, and electrical generating equipment.

Commencing our description of the new plant with the introduction of the coal to the works, this is delivered

[*Photo. by Elliott & Fry, Ltd.*

Mr. F. C. TAYLOR,

Engineer, Manager, and Secretary of the Shanklin Gas Company.

from the railway siding situated above the works level, and conveyed to the coal store by means of band conveyors. The walls of the coal store are constructed of reinforced concrete, and the conveyor is fitted with a throw-off carriage, enabling the coal to be fed to any part of the store. In the centre of the store is a breaker pit, where the coal passes to a powerful four-roll breaker, having two pairs of shafts fitted with claws, and incorporating an improved form of "shearing bolt" device in the drive to act as a protection for the shafts and gearing in case of undue strain being imposed upon them. The breaker is capable of crushing various classes of large coal, down to pieces not exceeding 1¼ in. cube, at the rate of 20 to 25 tons per hour.

The crushed coal passes to a totally-enclosed bucket elevator, driven by a separate 6-H.P. motor (by the Electric Construction Company) fitted with back gear, which elevates it to a push-plate conveyor, with trough 1 ft. 6 in. wide. The conveyor is driven by a separate motor of the same speed and H.P. as that used for the elevator, but without back-gear, and this in turn discharges the coal to the continuous overhead hoppers which supply the retorts.

FIG. 1.—RETORT HOUSE STAGE FLOOR—CHARGING SIDE.

Ten slide doors are fitted to the conveyor trough, and are operated from the platform alongside the hoppers.

The continuous overhead hoppers measure 60 ft. in length by 10 ft. wide by 8 ft. 10 in. overall, giving a capacity of about 100 tons, based on 43 c.ft. per ton when heaped. The bottoms of the hoppers are fitted with twelve Aldridge & Gibson patent automatic doors working in cast-iron slides. A platform 20 in. wide is provided alongside the hoppers. The capacity of the continuous hoppers represents about forty-eight hours' supply of coal.

There are three electric starting panels for operating the coal-handling plant, interlocked so that starting must be effected in the following order: 1, push-plate conveyor; 2, elevator; 3, breaker and feeder.

Retort House.

The new retort house, which entirely supersedes the old building, measures some 80 ft. in length by 57 ft. wide by 40 ft. 6 in. to the eaves, and is constructed on reinforced concrete foundations in the form of a raft, built by Messrs. K. Holst & Co., of 1, Victoria Street, S.W. 1. The house is steel-framed, with brick panels and asbestos roof sheeting.

The retort bench built by Messrs. F. C. Sugden & Co., Ltd., of Leeds, is 64 ft. 6 in. long by 20 ft. wide by 24 ft. 6 in. high, consisting of six arches 8 ft. 6 in. wide, with division piers 18 in. thick and end piers 3 ft. thick. The main flue is situated on the longitudinal centre line of the bench, running the full length of the bench and connected up to the base of a 70-ft. chimney at one end. There are three through regenerator furnaces, 11 ft. deep floor to floor, and built on Sugden's patent tubular regenerator principle, with their improved step-grate fittings.

Capable of producing about 1 million c.ft. of gas per diem, the retorts are of "D" section 24 in. by 16 in. by 20 ft. long overall, being constructed of "Stourbridge" material 3 in. in thickness throughout. There are three settings of eights, arranged in four tiers, at the moment in operation, the remaining three arches being empty for the time being. The retorts are set on the most up-to-date principle and in such a manner as to ensure an even distribution of the heat throughout their entire length. All the flues in the settings are of the same area, while sight-

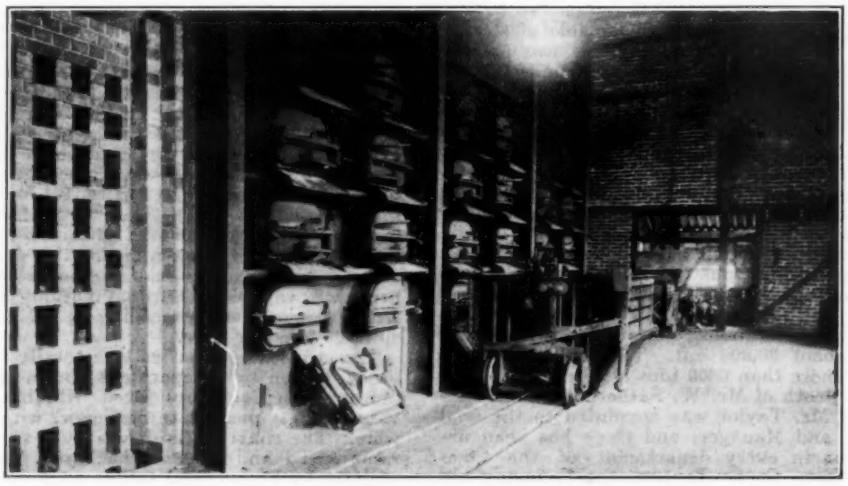


FIG. 2.—DISCHARGING SIDE OF RETORT BENCH.

boxes are provided wherever possible to facilitate inspection and cleaning out. The whole of the retort house on both sides and at both ends of the bench, and also at the ground-floor and stage-floor levels, is paved with Staffordshire blue chequered paving bricks.

Congdon Scrubber Standpipe System.

The installation includes a complete system of Congdon scrubber standpipes, which are arranged on the charging side of the retort bench, two standpipes to each setting of retorts. Each standpipe is suitably proportioned for conveying the gas from four retorts, and fitted with the necessary cast-iron disc valves at each connection to the retort mouthpieces, together with suitably arranged operating levers. At the lower end of the standpipes are liquor sealpots with provision for liquor overflow and downtake pipes leading to a liquor return main for conveying the circulated liquor to the separating tank. Each uptake branch pipe is provided with a liquor spray nozzle, and also a suitable isolating device for the purpose of completely isolating the whole standpipe from the collecting main when necessary.

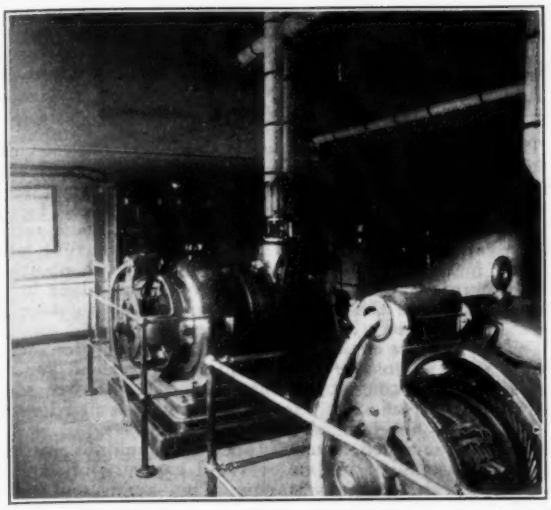


Fig. 3.—Electrical Generating Plant.

The retort house governor is of the Arca hydraulic relay type. It comprises a relay and pilot valve mounted on the gas vacuum type panel, and a hydraulic cylinder operating a butterfly type gas valve in the foul main. Minute changes of pull are transmitted from the relay to the pilot valve, which controls the water to or from the cylinder to move the valve as required to correct the pull. The pull is measured by an Arkon recorder, the scale of which is from *plus* 0·2 in. to *minus* 0·4 in. W.G. over a chart width of approximately 6 in. Even with this large multiplication the Arca governor maintains a very good line.

The liquor circulating pumps are in duplicate, of the steam-driven horizontal flywheel type, constructed by Messrs. Joseph Evans—one acting as a standby.

Fiddes-Aldridge Charging Machine.

The charging machine is of the latest Fiddes-Aldridge type, made and supplied by Messrs. Aldridge & Ranken, and incorporates many improvements. The machine, which is suitable for dealing expeditiously with the six beds of retorts, is simultaneous in its action—*i.e.*, charging and discharging are effected at one and the same time, one stroke sufficing for the double purpose of pushing out the coke and laying the new charge of coal.

The charging unit is of the makers' latest design of open-sided chain, working in conjunction with a sliding trough; heavy and level, while lightly laid, charges being assured without spillage. The machine takes its supply of coal automatically from the continuous overhead bunkers by means of the Aldridge & Gibson doors already referred to.

An improved arrangement of striking gear is provided for operating these doors. The gear, being situated on the front and side of the hopper, is so connected that it may be thrown in and out of action by the driver from his platform. The conveyor chain wheel is of the usual polygonal type, round which the open-sided chain is wound, while to enable the machine to work and receive coal at the different levels of retorts, an efficient telescopic chute is provided. A sliding trough bridges over the space between the machine and the retort mouthpiece.

The Coke Plant.

The plant consists of two parts—namely, the conveying plant and the cutting and screening plant. The coke is discharged from the retorts into a specially designed wagon which easily receives a full charge without spilling. The chassis consists of a channel steel frame with cast-steel roller-bearing wheels and is designed to avoid distortion by the hot coke. The lower part of the sides of the wagon is hinged to swing outwards to allow the coke to discharge on both sides to give a large storage area along the length of the track. The doors are automatically opened by cams suitably placed along the track, any one of which can be brought into position as required. The doors are also automatically closed by a fixed cam before the wagon enters the retort house on the return journey.

The wagon is driven by an endless wire rope haulage system with a fleeting drum, worm reduction gear, electric motor, and magnetic brake housed in a lean-to built on

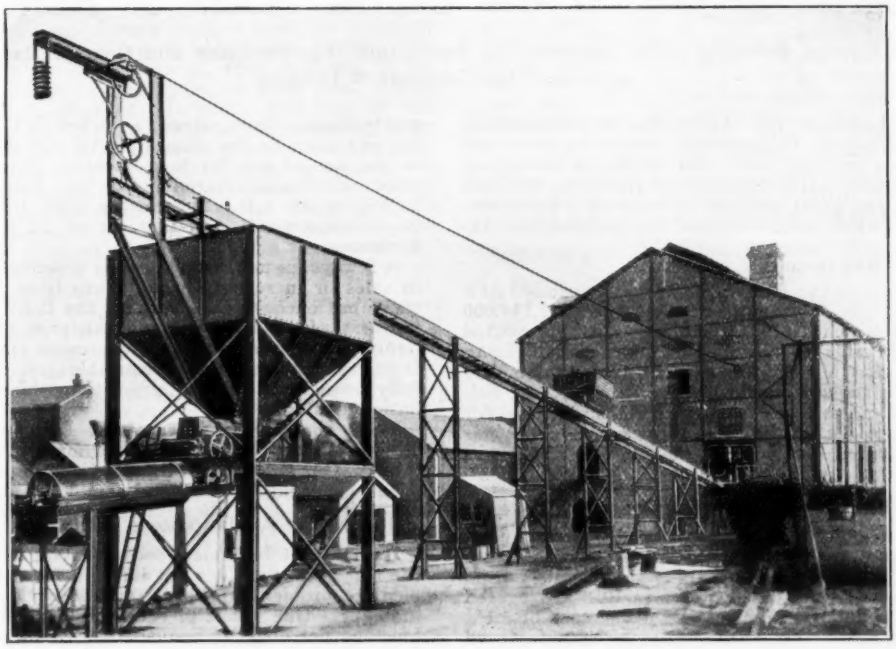


FIG. 4.—COKE STORAGE PLANT IN YARD.

to the end of the retort house, and the correct tension of the wire rope is maintained by a balance weight. The wagon is fitted with an automatic safety gear to prevent its running back down the incline should the wire rope or any part of the driving gear fail. Control is by means of an Ellison tramway type controller fixed near the doorway, so that the operator has a clear view in all directions.

Fig. 5.—Coal Storing Plant.

A quenching platform with sprays supplied from the water tower is arranged outside the retort house.

A bunker holding about 12 tons is fixed at the upper end of the track, into which the coke is discharged when required for cutting and grading. Under the bunker is a shaker plate feeder which regulates the flow of coke into the cutting machine This machine has a capacity of 10 tons per hour and is fitted with manganese steel cutters which are adjustable for sizing the product, and is fitted with a special gear which allows adjustment for size to be made while running. Relief springs are also fitted to prevent damage by foreign material. The cutters and their shafts are detachable without dismantling the main frame or hopper.

From the cutting machine the coke is taken to a rotary screen with two sizes of holes for taking out small coke and breeze. The drive to the cutting machine is by electric motor and worm reduction gear, and the various auxiliary drives are arranged through gearing.

The two electric motors are totally enclosed, and the whole coke plant was designed and manufactured by the Midland Ironworks (Newark), Ltd., Newark-on-Trent.

Electrical Generating Plant.

The electrical generators are in duplicate, each set consisting of one Sissons' vertical enclosed forced lubrication engine of the single-cylinder, double-acting type, direct coupled to a 33 kw. D.C. dynamo manufactured by the Electric Construction Company. Either of these sets is easily capable of supplying the necessary current when stoking machine and coke bus and coal storing plant are all working together, or when the coal store plant in the retort house and the coal plant from railway to store are working together.

The engines are capable of about 5% overload for several hours, with 80 lbs. pressure, and 25% overload for two hours when working at 100 lbs. pressure, with free atmospheric exhaust at 625 r.p.m. Each engine is fitted with a "Wakefield" mechanical lubricator.

Of the open-ended bracket type, the dynamos are level compound wound, with an overload capacity of 25% for two hours and 50% momentarily. They are wound for 225 volts D.C. This plant is housed, complete with switchboard, &c., in an existing building adjoining the exhauster house.

The declared calorific value of Shanklin's gas is 450 B.Th.U., and the price is 1s. per therm. The capital per million c.ft. of gas made is £690. The Shanklin Gas-Works are ideally situated, and the recent additions to the plant render the gas-making equipment very up-to-date.

These additions consist of two sets of water gas plant by Messrs. Humphreys & Glasgow—one 250,000 c.ft. and one 450,000 c.ft. per day capacity; complete plants for the "Dri-Gas" process, oil regeneration, oil washing for naphthalene removal, benzole recovery, and a Connersville meter of 1 million c.ft. capacity per diem erected by Messrs. W. C. Holmes & Co., Ltd.; an electrical boosting plant in duplicate by Messrs. George Waller & Son, Ltd.; and two station governors by Messrs. W. Parkinson & Co.

Progress of Gas in the United States of America*

By Arthur Hewitt, President of the American Gas Association; Vice-President and General Manager of the Consumers' Gas Company of Toronto.

In 1919, the American Gas Association was organized, absorbing the National Commercial Gas Association and the American Gas Institute, and later uniting in its organization the Natural Gas Association of America, so that, to-day, we have one great national association truly representative of the whole manufactured and natural Gas Industry.

Remarkable Expansion.

The gas business in the United States has expanded in a remarkable way. In 1932, gas sales aggregated 1,748,000 million c.ft., of which 1,376,000 million c.ft. represented natural gas, with sales of manufactured gas amounting to 372,000 million c.ft. Most of this gas was used for domestic purposes, such as cooking, water-heating, &c., and the balance in industry and in house-heating, the amount used for illuminating being negligible. The total value of the gas sold by the Industry last year in the United States was 754,000,000 dollars.

The Statistical Situation.

Any discussion of "The Gas Industry" necessarily includes a reference to the statistical situation, although I promise to deal with very few figures. Revenues from manufactured gas in the United States in 1913 aggregated about 413,250,000 dollars, representing a decrease of 5·1% from the 1931 figure. While total sales of manufactured gas to consumers registered a decline of 4·8%, an outstanding exception to the general trend was the increase shown in the use of gas for house-heating purposes. In 1931, sales of manufactured gas for house-heating were 19,908,100,000 c.ft., but during 1932 this figure rose to 20,445,600,000 c.ft., an increase of 2·7% in this class of business.

A few years ago, any business statement showing a loss in sales or in revenue would have been regarded as anything but encouraging, but, in the light of the history of business of all kinds during the past three years, such figures as we are now able to present concerning the Gas Industry are distinctly favourable and encouraging, and fully demonstrate the vital position which we occupy as a basic industry.

The technical excellence of the Industry, always generally recognized, and inferior to none, has been fully sustained. Our service to the public is unimpaired; our skill in production and distribution has not suffered in the least.

Immediate Problems.

I would not be understood as saying or intimating that the Gas Industry does not have to face and deal with immediate problems quite as serious as those of almost any industry. One result of economic conditions has been intensified fierceness of competition, and the invasion of the fuel market by those who would seek business wherever it may be obtainable and sometimes at almost any price.

* From the Summer Number of *West's Gas*.

The low selling prices of competing fuels, especially coal and oil, and to some extent electricity, have proved to be real obstacles to the advancement of the Gas Industry, and in many instances a threat to the holding of present business. We may hope that in some respects these prices are temporary, and that the pressure of competition from such sources will be relieved, in response to the apparent early trend towards a strengthening of commodity prices. We may expect, however, that installations made now on the basis of low cost of competing fuels and certain improvements made in the appliances in which these competing fuels are used, will continue for a long time to be factors in the life of the Gas Industry.

Competitive Forces.

It is obvious that the gas business, with its heavy investments, with its long experience in furnishing the most dependable, the most flexible, and, for the most part, the most efficient and most economical fuel, cannot afford to disregard these competitive forces. The Industry, organized in a national association, and in regional and state associations, with combined forces can do what no one company could well undertake by itself, and has shown adequate realization of the situation which confronts it.

The American Gas Association, for instance, is continuing a considerable part of its research in the industrial field. This has two phases: First, the determination of scientific facts concerning heating applications in the industrial world; and second, the development of efficient gas-burning appliances adapted and adaptable to the needs of the consumer. We do not propose to be left behind in the race which will certainly come with a revival of industrial activity.

In the commercial field, the activity of competitors manifests itself very largely in an endeavour to take from the Gas Industry a portion of the load used by hotels, restaurants, and bakeries. We have been able to demonstrate that in heavy duty equipment our manufacturers have more than maintained the efficiency of their appliances, and have, in fact, improved them to a marked degree. In straight competition, we have little to fear in the field of utilization. When rates are made specifically to get the business, perhaps without regard to the economics of the competing business, it stands to reason that everybody is going to lose, and nobody will gain except for a temporary saving to the customer who, in the long run, is likely to suffer through the purchase of equipment which may have no permanence, or in the impairment of the service given to him, the quality of which service is so vitally important to him.

Domestic Utilization.

In the fierce struggle for business, sometimes at any cost, the field of domestic utilization is also being invaded. Here again our manufacturers deserve credit for constantly improving their appliances so as to afford the highest range of service, of convenience, and of safety. We can still supply the best and most modern methods of cooking, at the lowest cost, unless one considers in the matter of cost-comparison a return to the old method of coal stoves, which is scarcely thinkable.

It is not sufficient that *we* know we can furnish to the housewife and the public restaurant the best and most satisfactory methods of cooking at the lowest cost; we must let *them* know about it. To this end, and in order to present a united front and to help each other in the Industrv. the American Gas Association has created a National Directing Committee, composed of leading executives in the natural gas and manufactured gas Industry, to correlate thought and stimulate united effort. This Committee has already sponsored a course in cooking with gas, which has been offered to the member companies of the American Gas Association and is receiving widespread approval.

The activities to be promoted by the National Directing Committee also include:

1. Training of sales personnel.
2. The establishment of Home Economics Services.
3. Encouragement of dealer selling and greater development of utility co-operation with dealers.
4. Application of sound promotional rate structure for development and retention of domestic business as well as commercial and industrial load.
5. Establishing co-operative measures to provide laboratory facilities for manufacturers for research work in connection with improvements in domestic, commercial, and industrial equipment.

Morale Unbroken.

One might sum up by saying that the Gas Industry has survived three years of depression with its morale unbroken, its resources not seriously affected, its stability fully demonstrated, and its essentiality fully understood and generally appreciated. The future of any industry of which this can be said is assured.

The Rational Examination of Coal*

By Wilfrid Francis, M.Sc.Tech., Ph.D, F.I.C.

Briefly, the following may be taken to represent the steps in the formation of coal from a mass of plant life deposited in a manner similar to the peat bogs found to-day. The plant substances in the deposit are first subjected to the action of bacteria of various types to form peat, which, after burial, is transformed into coal. The type of coal formed depends upon the magnitude of the maturing forces and upon their duration, moderate temperatures operating for a long time being sufficient. Differences in temperature are probably responsible for the variations in the amount of change of the coal substance in different portions of the same seam, producing coals of different rank from the same original stretch of plant life. It is usual to assume that high rank coals have passed through all intermediate ranks during their formation from peat.

The term "Rank" may be defined as "The stage of coalification which the vegetable matter has reached." It is apparent that in any one seam of coal a number of different types of plants may be found. This, however, is not of great importance, since the chemical ingredients of plants are similar. Their main structure is some form of cellulose, certain cells being composed of simple cellulose, others of compound celluloses. In all plants there are waxy skins which protect the delicate cells on the outside of young stems, leaves, and reproductive organs, from decay. The mode of propagation of the early plants which formed coal was by means of primitive seeds, called spores. These contained oily constituents besides being protected by an outer, waxy skin. In addition to the above chemical ingredients, waste products of plant life, of which resins are probably the most important, are usual plant constituents. Traces of colouring matter and similar compounds are also present, in quantity too small to be of any importance in the formation of coal, and soluble, easily decomposed materials, are present in the watery contents of the plant cells. These cannot be expected to have survived during the coal-forming changes. Thus, only a few types of chemical compounds can have played an important part in coal formation and survived the coalification processes. Some of the original plant ingredients appear in coal in form little changed from the original. Others are changed considerably, though still possessing sufficient of the original characteristic properties to make identification of the parent plant substance possible.

Behaviour of Plant Ingredients during Coal Formation.

Foremost in quantity in coals are the derived products of the woody structures of the plants, the celluloses. It appears that during the formation of coal the celluloses are changed mainly into one type of compound. This is a dark brown substance, easily powdered, and present to the extent of 75 to 95% in British coals, though varying in properties progressively with increasing rank. The term "Ulmic" or "Humic" acid has been used for many years to describe this material when present in soil or peat. As its name implies, it possesses certain properties characteristic of an acid. For example, it is soluble in alkaline solutions and forms metallic salts. Ulmic acids in many lignites are still soluble in alkalis, though with increasing difficulty as the rank of the lignite increases. In bituminous coals, and coals of higher rank, the substance is no longer soluble in alkalis, though its other properties change a little at a time, but progressively, with increasing rank. To show their derivation, but to indicate that the acidic properties have been suppressed, the term "Ulmin" is used for the ulmic acid derivatives in bituminous coal and coals of

* From a paper before the East Midlands Section of the Institute of Fuel.

higher rank. It will be understood that the properties of all coal ulmins are similar in general nature but differ in degree according to the rank of the coal. When discussing coal ulmin the term ulmin must therefore be associated with a term indicating rank, as, for example, the ulmin of a semi-bituminous coal. Numerical expression may be given to the term rank so as to define accurately the nature and properties of the coal ulmin present in any coal. Since ulmin is the predominating ingredient of coal, the rank of a coal is best defined by measuring the state of coalification of the ulmin present.

There is present in many coals a smaller amount of a material that appears to be a modified form of ulmin. This is often present in fair proportion in dull coals, and may be said to be a characteristic ingredient of such coals. Microscopical examination of coal shows that whereas the ulmin appears dark red in thin section, often showing the outline of the original cell structure of the plants, this modified form of ulmin is darker and almost opaque, being quite structureless. Until more is known of the origin of this material, it may be referred to as " opaque matter." It is, presumably, a derivative of some form of cellulose.

Though resins are usually not present in large quantities in plants, they are extremely resistant to decay and tend to be concentrated in the resultant coal, since much of the plant material is lost during the coal-forming changes. Even so, the proportion of resin in British coal is seldom more than 5%.

Certain ingredients of plant life resist decay to some extent, but are modified slightly to give products resembling complex hydrocarbons. Hydrocarbons are not usual plant ingredients, yet they are found in small quantities in coal. These hydrocarbons are far too heavy to be used as petrol or Diesel fuel, but such products may be obtained by cracking at high temperatures or by hydrogenation.

The waxy coats of the tender portions of the plants and of the spores resist decay and appear in coal in a form little altered in appearance though modified slightly in chemical properties. They may be present in some coals in proportions up to about 20%.

There is little or no free carbon in coal. The only material resembling carbon in appearance or properties in coal is the substance known as mineral charcoal, to which the modern name of " Fusain " has been given.

Properties of the Chemical Compounds Present in Coal.

It is evident that coal is a complex mass containing a number of definite types of chemical compounds, the properties of any coal depending upon the properties of the chemical compounds, upon the proportion of each that is present, and upon the stage in the process of coalification reached by the coal mass—*i.e.*, upon its rank. In addition, coal is always associated with mineral matter, which is of importance in industrial operations, and its properties may be modified by the physical state of the coal particles.

As regards the chemical properties of the pure coal substance, it is apparent that, in order to make a useful, or rational, examination of coal, one must possess a knowledge of the properties of the chemical ingredients of the coal, of the proportions in which they are present, and of the rank of the coal.

The chemical properties of the resins and hydrocarbons in coal are very similar. They are soluble in many organic solvents, advantage being taken of this fact to isolate them in comparatively pure form from the rest of the coal.

Both substances are extremely inflammable, and burn with a long, smoky flame. On the other hand, they are resistant to oxidation at low temperatures—that is, at temperatures below what might be called their flash points. Though solid at ordinary temperatures, they melt easily and distil almost unchanged under vacuum at temperatures between 300° C. and 350° C. In commercial distillation processes they give rise to tars of a resinous or hydrocarbon nature, the nature of the product depending upon the temperature of distillation. In low-temperature distillation processes they distil almost unchanged, but at high temperatures some cracking occurs, gas of high calorific value containing unsaturated hydrocarbons is obtained, and smaller yields of tar of a different type are obtained. Hydrogenation under pressure converts both resins and hydrocarbons rapidly and completely into low boiling hydrocarbons.

In the pure state, resins and hydrocarbons contain neither sulphur nor nitrogen, though such materials extracted from coal almost invariably contain small quantities of these elements, probably due to imperfect separation. Their ultimate analyses differ markedly from the analysis of coal, invariably containing a greater percentage of hydrogen. Of the many published analyses of resins and hydrocarbons separated from coal, the following may be taken as being typical:

Resin—Carbon, 80·5%. Hydrogen, 7·5%.
Hydrocarbons—Carbon, 88·5%. Hydrogen, 11·5%.

The properties of the resins and hydrocarbons do not appear to vary with the rank of the coal except in extreme cases. Coals of extremely high rank, containing more than about 89% of carbon, contain little or no material extractable by solvents. Apparently above a certain rank the resins and hydrocarbons are modified so as to be no longer soluble and, presumably, in such cases their other properties, including ultimate analysis, are also modified.

The properties of the plant skins resemble in many ways the properties of the resins and hydrocarbons. This is to be expected, since on heat treatment the skins decompose almost completely into liquid and gaseous products rich in hydrocarbons. A comparable familiar substance is linoleum, which, as is well known, is a good waterproof material and on heating gives a thick black tar with an aromatic vapour. Modern plant skins on distillation give yields of more than 60% of tar, consisting mainly of hydrocarbons. Fossil plant skins, which may be isolated readily from the surrounding mineral or low rank coal, give yields of tar, on distillation, of more than 40%, while, from what evidence is available, the skins in medium and high rank coals are of similar nature and give high yields of hydrocarbon-rich tars on distillation, together with a luminous gas, rich in hydrocarbons. Also, as expected, the plant skins in coal are highly inflammable at elevated temperatures, though extremely resistant towards oxidation at low temperatures. This extreme resistance to low-temperature oxidation enables the plant skins to be separated from the surrounding coal, their quantity estimated, and their properties examined. Modern plant skins are rich in hydrogen and low in carbon compared with coal. The plant skins in coal contain rather more carbon and less hydrogen—that is, they have been modified a little in composition during coalification. An analysis of plant skins separated by the author from a Midland coal is, carbon, 77·0%, hydrogen, 7·1%. Nitrogen and sulphur were not determined, though modern plant skins contain neither of these elements. The properties of the plant skins do not appear to vary greatly with the rank of the coal, though it is probable that the characteristic properties of these substances also are modified in high rank coals.

The properties of the ulmins are of great importance in view of the preponderance of such materials in coal. The most striking property of the ulmins is the ease with which they oxidize, or take part in chemical reactions, at low temperatures, compared with the inactivity of the other ingredients of coal in this respect. During such oxidation the ulmins in bituminous coal become soluble in alkaline solutions, leaving the other, inert, ingredients behind. This is fortunate, since it enables a separation to be made of the ulmins from the plant skins. Though the ulmins are modified by oxidation and the properties of the soluble ulmins produced are different in some respects from those of the parent insoluble ulmins, the properties of the plant skins are substantially unchanged by this treatment.

The coal ulmin molecule is extremely complex and consists of a compact nuclear structure, consisting essentially of a large number of carbon atoms arranged in groups of five and six in rings, surrounded by numerous, rather loosely attached, organic groupings, that are readily attacked by oxygen or other chemical reagents. With increasing rank the nucleus becomes more compact and the number of active external groups diminishes progressively. Extremely high rank coal ulmin tends to the structure of carbon, which, of course, contains no hydrogen, the molecule of which consists of numbers of carbon atoms arranged compactly and symmetrically in groups of six in ring structures.

It is this gradual increase in compactness of the ulmin molecule that causes the differences in properties observed with increasing rank. Thus, the higher the rank of coal ulmin the more difficult to oxidize and to take part in chemical reactions. With increasing rank there is an increase in the carbon content of the ulmin and a decrease in hydrogen and oxygen. The temperature of main decomposition of the ulmins during destructive distillation also increases progressively with increasing rank. Thus, in order to measure the rank of coal ulmin, it is only necessary to measure one or other of the above three properties. Of these, the change in decomposition point is too inaccurate a method of measuring rank; change in ultimate analysis would be a good method if it were possible to isolate unchanged coal ulmins in pure form from the other coal ingredients; but it is possible to measure the reactivity of the ulmin towards oxidizing agents accurately.

The products of distillation of coal ulmins depend upon their rank, though, in all cases, the products differ considerably from those of the coal ingredients discussed previously. From low rank coal ulmins—that is, ulmins containing about 80% of carbon—a comparatively small amount of liquid distillate is obtained, consisting mainly of water and phenols. The yield of liquid products from ulmins decreases with increasing rank. A relatively large

yield of gas, rich in hydrogen and methane and poor in unsaturated and heavier gaseous hydrocarbons, is obtained by the distillation of low rank ulmins. With increasing rank, the gaseous products of distillation become richer in hydrogen and poorer in heavier hydrocarbon gases.

The opaque matter in a coal has properties similar to an ulmin of higher rank than that of the ulmin with which it is associated. Thus, it is more resistant towards oxidation, though the product of low-temperature oxidation is a soluble ulmin with properties indistinguishable from those of the soluble ulmin produced from the associated ulmin. Its temperature of main decomposition is from 20° to 30° C. higher than that of the associated ulmin, but the products of distillation are of similar type. Finally, the percentage of carbon is higher and of hydrogen is lower than that of the ulmin present. As in the case of true ulmin, it is not yet possible to isolate opaque matter in pure form from the other coal ingredients and its properties, and ultimate analyses have to be deduced from the corresponding properties of coals rich in the material, and from the properties of partially separated materials or from simple derived products.

It is clear, from what has been said, that mixtures of such ingredients in varying proportions, as occur in coal, will have many different properties, depending upon composition of the mixture.

Rational Analysis of Coal.

In order to measure the proportions of ingredients present in a coal, advantage is taken of the characteristic properties of the ingredients. Leaving out of consideration for the moment the fusain, separation of the ingredients in a coal and estimation of the amount of each present may be made as follows: The resins and hydrocarbons may be removed by solvent extraction, usually by the use of pyridine and chloroform. Separation of the mixed resins and hydrocarbons may be made by the use of ether and hexane. Solution in ether removes certain impurities from the crude extract, and hexane dissolves the almost pure hydrocarbon from the ether extract.

The coal residue, from which the resins and hydrocarbons have been removed, consists of ulmin, opaque matter, and plant skins. The ulmin and opaque matter may be converted into soluble ulmins by oxidation with certain oxidizing agents, and may be removed from the plant skins by solution in dilute alkaline solutions. The estimation of the relative proportions of true ulmin and opaque matter is made by the use of different oxidizing agents, or by drawing curves showing the amount of solubility produced against time with a standard oxidizing agent.

Composition of Types of Coal Present in Banded Bituminous Coal.

There remains to discuss methods for the estimation of the rank of coal before a discussion of rational classification and utilization can be considered. Before doing so, however, it is of interest to discuss the composition of the well-defined types of coal that may be observed in any lump of coal. These are the different bands, first described by Stopes and Wheeler, called "Vitrain," "Clarain," "Durain," and "Fusain." Their appearance is too well known now to require a description. As the result of the above rational analysis of many samples of such types of coal, the author has come to the following conclusions regarding their composition.

Vitrains consist almost entirely of ulmins, resins, and hydrocarbons. The proportion of ulmin present in a vitrain is seldom less than 90% and seldom more than 95% of the pure coal substance.

Fusains consist mainly of highly carbonized cell fragments, impregnated by—or associated with—varying amounts of ulmins. A good sample of fusain, carefully separated by hand from the rest of the coal, may contain as much as 90% of carbonized fibres.

Clarains and durains may best be considered together, since they usually contain the same ingredients, and there is no sharp line of demarcation between such types of coal. In any lump of bituminous coal there may be many bands intermediate in appearance between material that is definitely clarain and material that is definitely durain. In other words, there are types of coal with many intermediate degrees of brightness or dullness, between the smooth, glossy clarain and the dull, granular durain. The main chemical difference between these types of coal is in the proportion of opaque matter present. True clarains, with a bright silky lustre, contain little or no opaque matter. With decreasing brightness, the proportion of opaque matter increases until in some durains opaque matter is the predominating ingredient. All these types of coal contain plant skins in varying proportions, in addition to true ulmins, resins, and hydrocarbons. Generally, a high proportion of plant skins is found in coals with a high proportion of opaque matter, though some characteristic clarains have been found containing as much as 15% of plant skins. As an arbitrary line of demarcation, a coal containing plant skins may be termed clarain if it contains less than 5% of opaque matter, and durain if it contains more than 5% of opaque matter.

(To be concluded.)

Gas Companies' Results.

Melton Mowbray.

In their 99th Annual Report the Directors of the Melton Mowbray Gas Light and Coke Company stated that the consumption of gas has been maintained. A contract has been entered into for the installation of vertical retorts in place of the present horizontals. At the annual meeting a final dividend of 24s. per share (less tax), making 10% for the year, was declared.

St. Neots.

A dividend of 11%, less income-tax, recommended by the Directors at the annual meeting of the St. Neots Gas and Coke Company, was approved. At a subsequent meeting of the Directors it was decided to reduce the price of gas from 5s. 5d. to 5s. per 1000 c.ft., the reduction to commence with the next meter reading.

Sherborne.

A satisfactory year's working was reported at the 96th annual meeting of the Sherborne Gas and Coke Company, Ltd., when Mr. T. E. Vincent, Chairman of the Board of Directors, presided. The report of the Directors and statement of accounts showed that there was a balance of £13,136 on the capital account, while the revenue account showed a balance of profit on the year's transactions of £2570. The profit and loss account, after paying interest on debentures and loans, showed an available balance of £10,274, from which amount the Directors recommend dividends of 5% on the preference shares and 10% on the ordinary shares, both less income-tax. The reserve fund showed a balance of £3380, which was invested in the capital of the Company. The sale of gas for the year was 59,555,400 c.ft., a decrease of 1,520,400 c.ft., and the number of ordinary meters in use was 628, prepayment 1168, an increase of 29. The number of cookers now let on hire was 302, with prepayment meters 1083, total 1385, an increase of 10. In moving the adoption of the report, the Chairman said he regarded it as very satisfactory, considering the general depression and competition.

Corporation Undertakings' Results.

Accrington.

The quantity of gas accounted-for totalled 517,182,000 c.ft.—an increase of 3,096,400. The proportions sold for different purposes were: Industrial, 11·33%; public lighting, 3·39%; prepayment consumers, 52·78%; other consumers, 32·50%. The sales of cooking and heating appliances also show a substantial increase. Mr. A. J. Harrison, the Manager, at the meeting of the Accrington and District Gas Board, said consideration was being given to the method of charging for gas with a view to offering more favourable terms to encourage extended use. It was also opportune to launch a new system of charges more equitable than the existing method, which, while not penalizing the small or non-profitable consumer, would give substantial relief to the paying consumer. The Board adopted a new scale of charges for domestic users involving reductions totalling over £5000 per annum. The reductions do not apply where consumption is under a certain figure.

Chesterfield.

Sales of gas have increased by 5·11%, accompanied by a decrease in the unaccounted-for gas of nearly 1%. The costs of the various items included in manufacture total 1·56d. per therm sold, against 1·77d. per therm in the previous year, the lowest figure since the installation of the carbonizing plant in 1924, and a record. This includes the whole of the costs of repair and maintenance of works. The average cost of the gas sent out was 2·31d. per therm, based upon the whole of the costs incidental to delivering the gas out of the holders, and thus including coke oven gas. Distribution and sales cost 0·82d.; management and clerical staff, 0·29d.; finance and general charges, 0·71d.; rates and taxes, 0·88d.; and capital charges, 2·52d. per therm; the last item being on the decline. An oil regeneration plant was erected to work in conjunction with the oil washing naphthalene extraction plant, and has cut out the expense incurred in renewing the oil used, and its use for the purpose of gum extraction is still being experimented with.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The Stock Exchange has had another busy week. Nearly all sections participated in the activity, and apart from some profit-taking towards the end of the account quotations remained firm. The outstanding feature was the strength of Home Rails, brought about by the all-round increases in traffic returns, and prices rose sharply. Stimulated by the high price for the commodity, gold-mining shares again became popular and a big buying movement set in at the end of the week. The gilt-edge market was well supported and prices showed little change.

The Gas market fully participated in the general activity, and several substantial improvements in value were recorded. In view of the exceptional demand in other departments the continued strength of the gas section is remarkable, but the same can be said of gilt-edged securities, and while the yield on these remains at about 3½% the prices of gas stocks, subject to the maintenance of last year's dividend disbursements, should not be adversely affected.

Ordinary stocks were in steady demand throughout the week, and the list of gains is headed by Shrewsbury 5% with a rise of 10 points to 137½, and on the basis of a 6¾% dividend—the rate paid for the past four years—the yield at the price works out at £4 18s. 2d.%. Another sharp rise was that of Uxbridge 5% with 7 points to 149½, and the yield in this case on a 7% dividend is £4 13s. 7d.%. Bournemouth 7% maximum stock comes next with a rise of 6 points to 162½, followed by Tottenham ordinary with 4 points to 145½. Gas Light units hardened 3d. to 26s., and it will be seen by reference to the Stock and Share List that several stocks gained from a fraction to 2 points.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Aug.* 28.

The market for tar products continues steady, and current prices are as under:

Pitch, 80s. per ton f.o.b.

Creosote, 3d. per gallon.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole is firm at 2s. 7d. to 2s. 8d.; pure benzole, 1s. 9d.; solvent naphtha, 95/160, is firm at 1s. 7d. to 1s. 8d.; and 90/140 pyridine bases, 4s. 3d. to 4s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Aug. 28.

The average prices of gas-works products during the week were: Gas-works tar, 31s. to 36s. Pitch—East Coast, 75s. to 77s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde. 75s. to 77s. 6d.* Toluole, naked, North, 1s. 9d. to 1s. 10d. Coal-tar crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2d. to 2½d.; low gravity, 2d.; Scotland, 2d. to 2½d. Heavy oils, in bulk, North, 4d. to 4½d. Carbolic acid, 60's, 2s. 7½d. to 2s. 9d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Aug.* 26.

Conditions remain rather quiet in this area, but makers' quotations are fairly steady.

Crude gas-works tar.—The actual value is now 40s. to 45s. per ton *ex* works.

Pitch.—Inquiries are not plentiful and export value is called 75s. per ton f.o.b. Glasgow. For home trade price is unchanged at 75s. per ton f.o.r. in bulk.

Refined tar to Ministry of Transport specification is easy at 3½d. per gallon *ex* works in buyers' packages.

Creosote oil.—Prompt supplies are not plentiful, and prices are firm. B.E.S.A. specification is 2¾d. to 3d. per gallon; low gravity, 2¾d. to 3d. per gallon; and neutral oil, 2¾d. to 3d. per gallon—all in bulk *ex* works.

Cresylic acid is in slightly better call, but price level is unaltered. Pale, 97/99% is 10½d. to 11¾d. per gallon; dark, 97/99%, 9d to 10d. per gallon; and pale, 99/100%, 1s. 2d. to 1s. 3d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha.—Production is low and value is firmer at 4½d. to 4⅝d. per gallon f.o.r. in bulk, according to quality.

Solvent naphtha.—90/160 is scarce at 1s. 4d. per gallon, while 90/190 is offered at 1s. per gallon.

Motor benzole.—Price is nominal at 1s. 5d. per gallon *ex* works.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9	to	0	9½	per gallon at works
Motor ,,	1	4	,,	1	4½	,, ,, ,,
Pure ,,	1	7½	,,	1	8	,, ,, ,,

Contracts Advertised To-Day.

Coal.

Barrow-in-Furness Gas and Water Department. [p. 466.]

Gasholder.

Edinburgh Corporation Gas Department. [p. 466.]

Pipes and Specials.

Borough of Richmond, Yorkshire. [p. 466.]

Trade Notes.

Orders for Morris-Commercial Vehicles.

The London and North Eastern Railway Company have placed a further repeat order for 40 1-ton and 30-cwt. Morris Commercial lorries. They already have nearly 200 vehicles of this make in service in various parts of the country. Other orders for the new Morris-Commercial vehicles have just been placed by: Lord Sackville of Knowles, through Messrs. Humphrey & Co., Sevenoaks, the Earl of Dudley, through the Stour Valley Motor Company, Stourbridge, and the Countess of Inchcape, through Mr. James McHarrie, of Stranraer.

New Gasholder Contracts.

The Londonderry Gas Light Company have placed an order with Messrs. Firth Blakeley, Sons, & Co., Ltd., of Vulcan Ironworks, Church Fenton, for a 500,000 c.ft. capacity gasholder, to be fitted with "Vulcan" spiral carriages. This is a repeat order, the firm having installed a holder of the same size at the Londonderry Works last year. Also they have received an order from the South Yorkshire Chemical Works, Ltd., for a two-lift 500,000 c.ft. capacity holder for their Parkgate Coke Oven Works. Other gasholder contracts they have in hand include two-lift gasholders for the Chapel, Whaley, and District Gas Company, Ltd.; Pontefract Corporation; the Dorchester Gas and Coke Company, Ltd.; and the Newtownards U.D.C. In addition, gasholder improvements for the Shipley U.D.C. and the Blaenavon Gas and Water Company, Ltd.

Register of Patents

Shutting-off a Gas Supply Pipe in Case of Fire.—No. 390,371.

BARROW, C. F., of 30, Argyle Square, Sunderland, Durham.

No. 18,545; June 30, 1932.

This invention relates to means for shutting-off a gas supply or like pipe in case of fire, or when desired, and has for its object to provide improved means which, in case of abnormal rise of temperature, will operate automatically, but can be manually brought into operation at will, and, if desired, locked in the shut-off position to prevent unauthorized consumption. The device comprises a spring-loaded or weighted valve arranged in the gas or like supply pipe at a convenient position, the valve being adapted to be retained in a raised or open position by a movable arm which engages a groove, shoulder, or the like around the stem of the valve; the arrangement being such that movement of the arm out of engagement with the valve stem frees the valve, which immediately closes on to its seat and shuts-off the gas supply. Preferably the retaining arm is composed of, or is in parts joined by, a suitable alloy which fuses at a comparatively low temperature, so that, in case of an abnormal rise of the surrounding temperature due to fire or otherwise, the arm collapses and the valve closes automatically.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf-Yr. % p.a.	Dividends. Last Hf-Yr. % p.a.	NAME.	Quotations. Aug. 25.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Apl. 3	7⅞	7	Alliance & Dublin Ord. ...	120—130	...	122½—124
374,000	,,	July 10	4	4	Do. 4 p.c. Deb. ...	85—95	...	92½
557,655	,,	Mar. 6	7	7	Barnet Ord. 7 p.c.	157—162	...	...
300,000	1	May 8	1/4⅛	1/9⅜	Bombay, Ltd.	25/-—27/-	...	25/10½
178,280	Stk.	Aug. 14	9½	9½	Bournemouth sliding scale	192—202*	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	160—165*	+6	160½
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	135—140*	...	...
50,000	,,	June 26	3	3	Do. 3 p.c. Deb. ...	74—79	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	99—104	...	...
210,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
357,900	,,	Mar. 6	7½	7½	Brighton, &c. 6 p.c. Con. ...	153—158	...	...
540,000	,,	,,	6½	6½	Do. 5 p.c. Con. ...	143—148	...	145—147
195,500	,,	,,	6	6	Do. 6 p.c. B Pref.	133—138	...	...
1,487,500	,,	July 24	5	5	Bristol 5 p.c. max.	109½—110½*a*	...	...
120,420	,,	June 26	4	4	Do. 1st 4 p.c. Deb. ...	99—100*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	99—100*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	119—122*a*	...	...
855,000	,,	Apl. 3	7	8	British Ord.	147—152	...	152
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	145—150	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	108—113	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	94—99	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	103—113	...	...
160,000	,,	June 26	5	5	Cambridge 5 p.c. Deb. ...	115—120	...	...
100,000	10	May 22	6	4	Cape Town, Ltd.	7—8	...	7 7/16—7⅞
100,000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref. ...	7—8	...	...
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. ...	92—97	...	...
626,860	,,	July 24	6	6	Cardiff Con. Ord.	117—122	...	...
237,860	,,	June 26	5	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Aug. 14	6½	5	Chester 5 p.c. Ord.	105—110½*	...	...
98,936	1	May 22	2/-	2/-	Colombo, Ltd. Ord.... ...	25/-—30/-	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	18/6—20/6	...	...
609,204	1	Mar. 20	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	17/6—20/-	...	19/3
296,053	1	,,	1/3'30	1/3'30	Do. 8 p.c. Pref.	1 7/16—1 7/16	...	...
1,796,955	Stk.	July 24	6½	5	Commercial Ord.	114—119	...	116—117½
475,000	,,	June 12	3	3	Do. 3 p.c. Deb. ...	73—78	...	...
265,272	,,	Mar. 6	—	5	Do. 5 p.c. Deb. ...	120—125	...	...
807,560	,,	Aug. 14	7	7	Croydon sliding scale ...	143—148*	...	146
469,590	,,	,,	5	5	Do. max. div.	99—104*	...	103½—104½
500,000	,,	July 10	5	5	Do. 5 p.c. Deb.	118—123	...	...
542,270	,,	Mar. 6	7	10	Derby Con.	155—165*c*	...	...
55,000	,,	July 10	4	4	Do. 4 p.c. Deb.	93—98*c*	...	...
209,000	,,	Mar. 6	5	5	East Hull Ord. 5 p.c. ...	106—111	...	110½
179,500	,,	Mar. 6	6	6	East Surrey Ord. 5 p.c. ...	122—127	...	...
155,019	,,	June 26	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
1,002,180	,,	Apl. 3	†5	†7	European, Ltd.	132—137	...	136—140
19,373,992	,,	Aug. 14	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	25/6—26/6*f*	+-/3	25/10½—26/6⅜
2,600,000	,,	,,	8½	8½	Do. 8½ p.c. max.	83—86*	...	84½—85
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	100—103*	...	101—103
6,102,497	,,	June 12	3	3	Do. 3 p.c. Con. Deb. ...	77—80	+1	77½—80
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	114—117	...	116½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	112—115	+1	113½—113⅝
270,466	,,	Mar. 6	6	6	Harrogate New Cons. ...	115—120	...	...
82,500	,,	Mar. 6	7	7	Hastings & St. L. 5 p.c. Conv.	138—143	...	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	110—115	...	114
140,000	1	Apl. 24	†10	†10	Hongkong & China, Ltd. ...	28/-—30/-	...	...
218,200	Stk.	Aug. 14	6	6	Hornsey Con. 3½ p.c. ...	120—125*	...	...
5,600,000	,,	May 22	10	14	Imperial Continental Cap.	215—225	...	218—221½
223,130	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	88—93*	...	...
235,242	,,	Aug. 14	8½	8½	Lea Bridge 5 p.c. Ord. ...	167—172*	...	...
3,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord. ...	124—125*h*	+¾	...
245,500	,,	June 26	5	5	Do. 5 p.c. Red. Pref. ...	103—113*h*	...	...
306,083	,,	July 17	4	4	Do. 4 p.c. Deb. ...	99¼—101¼*h*	...	...
165,736	,,	Feb. 20	8	10	Maidstone 5 p.c. Cap. ...	180—200	...	...
56,176	,,	July 10	3	3	Do. 3 p.c. Deb. ...	69—74	...	...
75,000	5	June 12	†10	†10	Malta & Mediterranean ...	9—11	...	10½—10⅝
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Mar. 6	5	5	M. S. Utility "C." Cons. ...	103—108	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	93—98	...	...
112,126	,,	June 26	4	4	Do. 4 p.c. Deb. ...	100—102	...	...
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	113—118	...	...
675,000	,,	21 May '31	†6	†6	Montevideo, Ltd.	55—65	...	56—57
2,061,315	,,	Aug. 14	5	5	Newcastle & Gateshead Con.	24/3—25/-*d**	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	97—99*d**	...	...
776,706	,,	July 10	3½	3½	Do. 3½ p.c. Deb. ...	91—93*d*	...	...
277,285	,,	May 8	5	5	Do. 5 p.c. Deb. '43...	107—109*d*	...	...
274,000	,,	Aug. 14	5	5	Newport (Mon.) 5 p.c. max.	100—102*a**	...	...
204,940	,,	Mar. 20	7½	7½	North Middlesex 5 p.c. Con.	147—152	...	...
396,160	,,	Aug. 14	5	5	Northampton 5 p.c. max. ...	101—106*	...	...
300,000	,,	Apl. 24	9	7	Oriental, Ltd.	114—119	...	...
316,617	,,	June 26	8	8	Plym'th & Stonehouse 5 p.c.	158—163	...	...
504,416	,,	Feb. 20	8	8	Portsm'th Con. Stk. 4 p.c. Std.	161—166	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	104—109	...	...
114,000	,,	Aug. 14	5	5	Preston 5 p.c. Pref.	101—106*	...	...
686,312	,,	July 24	4	4	Primitiva 4 p.c. Rd. Db. 1911	86—91	...	...
389,813	,,	June 26	4	4	Do. 4 p.c. Cons. Deb.	82—87	...	...
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref. ...	6⅞—7⅛	...	6 15/16—7⅛
1,736,968	Stk.	Sept. 5	6	6	Sheffield Cons.	127—130*e*	...	...
95,000	,,	July 10	4	4	Do. 4 p.c. Deb.	90—94*e*	...	...
133,201	,,	Feb. 20	8½	5	Shrewsbury 5 p.c. Ord. ...	135—140	+10	...
90,000	10	June 12	15	14	South African	3—5	...	...
6,709,895	Stk.	Aug. 14	7	5	South Met. Ord.	125—130*	...	128—130
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	133—138*	...	...
850,000	,,	,,	20/-*g*	4	Do. 4 p.c. Irred. Pf.	98—102*	...	...
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb. ...	76—79	...	78
1 000,000	,,	July 24	5	5	Do. 5 p.c. Red. Deb.	110—114	...	112½—114
209,820	,,	Aug. 14	8½	8½	South Shields Con.	146—148*d**	...	...
1,543,795	,,	Aug. 14	6	6	South Suburban Ord. 5 p.c.	122—127*	...	125—125½
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	111—116*	...	...
300,000	,,	,,	—	4	Do. 4 p.c. Pref.	98—102*	...	...
868,837	,,	June 26	5	5	Do. 5 p.c. Deb.	118—123	...	...
100,000	,,	,,	—	—	Do. 4 p.c. Deb.	102—105	...	...
647,740	,,	Feb. 20	5	5	Southampt'n Ord. 5 p.c. max.	108—113	+1	110—113
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	99—104	...	...
350,000	,,	Mar. 6	9/-	5½	Swansea 5½ p.c. Red. Pref.	109—113	...	...
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	103—108	...	...
1,076,490	,,	Aug. 14	6½	6½	Tottenham and District Ord.	143—148*	+4	142½—145½
300,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	121—126*	...	122½
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	108—113*	...	112
199,005	,,	June 12	4	4	Do. 4 p.c. Deb. ...	96—101	...	...
85,701	,,	Apl. 3	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	80—85	...	...
347,759	,,	Mar. 6	7	7	Uxbridge, &c., 5 p.ct. ...	147—152	+7	147½—150½
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,322,220	,,	July 10	7	7	Wandsworth Consolidated	145—15	+2	147
1,096,373	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	...	115
1,317,964	,,	June 26	5	5	Do. 5 p.c. Deb.	118—123	...	123¼—124
158,400	,,	Mar. 6	5	6A	Winchester W.&G. 5p.c. Con.	109—114	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—For quarter. *h.*—Paid £3, including 10s. on account of back dividends. † The interest due 1/7/33 was paid on that date. * Ex. div. † Paid free of income-tax. ‡ For year.
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PATENTS for Inventions, Trade Marks "Advice Handbooks" and Consultations free. KING'S PATENT AGENCY LTD., Director B. T. KING, C.I.M.E., Regd. Patent Agent, G.B., U.S., and Can., 146A, QUEEN VICTORIA ST., E.C. 4, and 57, CHANCERY LANE (near Pat. Off.), LONDON, W.C. 2. 47 years' refs. 'Phone Cent. 0682.

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THE EUROPEAN GAS COMPANY, LIMITED.

NOTICE is Hereby Given to Holders of Share Warrants to Bearer that an INTERIM DIVIDEND of 2½ per Cent.—that is, Five Shillings per Share—will be paid, free of Income-Tax, on the 30th September next. Payment will be made by the National Provincial Bank, Ltd., 1, Princes Street, E.C. 2, after Serial Coupon No. 114 has been left there Three Clear Days for Examination.

AND NOTICE IS HEREBY FURTHER GIVEN that the TRANSFER BOOKS WILL BE CLOSED from the 12th September to the 29th September, both days inclusive.

F. ELIOT WILLIAMS,
General Manager and Secretary.

Montague House,
Devonshire Square, E.C. 2,
Aug. 22, 1933.

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FIRE-CLAY & BRICK WORKS

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Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

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150

ENGINEERS

Purify

66,000,000,000

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WITHSTANDS ABNORMAL PRESSURES

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LEAKAGE IMPOSSIBLE

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A Valve specially designed to meet the exacting conditions of Gas Works usage

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When closed, can be partially dismantled for inspection or cleaning purposes while still in operation

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NATURAL BRITISH PURIFYING MATERIAL

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SPENT OXIDE PURCHASED.

PATENTS.

For Patent Announcements see p. 463.

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Head of Department:
H. LAMBOURNE, M.A., M.Sc., F.I.C.

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Lecturers { F. WHITE, B.Sc., A.M.I.C.E.
W. R. BRANSON, B.Sc., A.M.I.C.E.

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Radium Works, 11, Radium Street, Oldham Road, MANCHESTER.

(*See advertisement Aug. 23, p. 373.*)

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"FALCON" INVERTED LAMPS,
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SUPERHEATER BURNERS, and
CONVERSION SETS for Street Lanterns.

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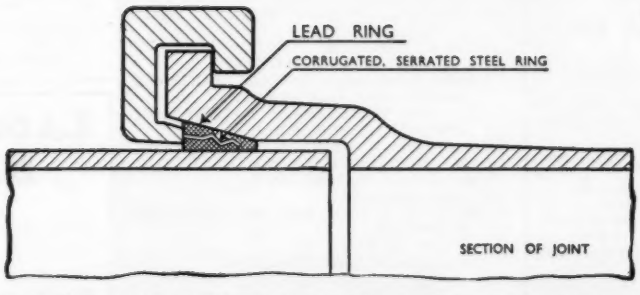
(Patent applied for)



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No. 8350.

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APPLICATIONS are invited for the Position of CHIEF ASSISTANT GAS ENGINEER. Applicants must have had a thorough Technical Training, and possess Knowledge and Experience of Modern Gas Manufacture and Works Routine, including Carbonizing in Vertical Retorts, Water Gas Plant, Electrical Plant, and Workshop Experience.

The Salary will be £500 per Annum.

Applications, stating Age (which must not exceed 40 years), Training, Qualifications, and Experience, accompanied by *copies* of not more than Three recent Testimonials, to be sent to the undersigned not later than Saturday, the 9th September, 1933, marked "Assistant Gas Engineer."

D. C. CROSS,
Engineer and Manager.

Gas-Works,
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Salary at the rate of £148 per annum, with annual increments according to scale (at present £10, to £178), subject to satisfactory service.

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The successful candidate will be required to contribute to the Superannuation Fund, if and when the Local Government, &c., Superannuation Act, 1922, is adopted.

Form of application will be forwarded on receipt of stamped addressed envelope, and must be returned, endorsed "Distribution Clerk," so as to be received by the undersigned not later than September 14th, 1933.

J. ENTWISTLE,
Town Clerk.

Town Hall,
Morecambe and Heysham.

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FIRST-CLASS Gas Fitter required. Thoroughly Qualified and Experienced in General Fitting Work, Iron, Compo, and all Modern Appliances, including Hot Water.

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Moss Lane,
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Aug. 18, 1933.

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Write, stating Particulars of Training, Experience, Age, and Salary required, to the ENGINEER and MANAGER, HAMPTON COURT GAS COMPANY, SANDY LANE, HAMPTON WICK, MIDDLESEX.

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GAS Engineer, M.I.Mech.E., M.Inst. Gas E., and of American Gas Assoc., 46, wide experience organizing, commercial, and administrative work, keen, active, and adaptable. Experienced horizontal, continuous, and intermittent vertical retorts and vertical chamber ovens. Tar distillation to refined Benzole and production of disinfectants; repairs and testing of consumers' meters and appliances. Extensive high-pressure distribution, industrial applications of gas, and general propaganda work. Ten years Engineer and General Manager of Municipal Undertaking in England, nine years recent experience as Chief Gas Engineer of Financial Corporation operating gas undertakings abroad, where by active propaganda collective output was increased from 2098 million to 3831 million cu.ft. per annum. Well acquainted modern American and German technical and commercial practice; wide experience constructional work by direct labour; excellent record of results achieved. Displaced as result of amalgamation, seeks Position in Gas or Allied Industry.

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1 LIVESEY WASHER, 1½ m.c.f.p.d.
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1 13½ h.p. Ditto.
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Tenders, specifying Pit Price, Railway Rate, and Wagon Hire, and the Seam and name and locality of the Pit from which the Coal is raised, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Coal," to be delivered at the Town Clerk's Office, Barrow-in-Furness, not later than Twelve noon on the 12th September, 1933.

The lowest or any Tender will not necessarily be accepted.

W. A. CHISLETT,
Town Clerk.

Town Hall,
Barrow-in-Furness,
Aug. 24, 1933.

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(GAS DEPARTMENT.)

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THE Magistrates and Council are prepared to receive TENDERS for the TAKING DOWN and REMOVAL of existing ONE MILLION CUBIC FEET GASHOLDER in Two Lifts with Guide Framing, and for the SUPPLY, Delivery, Erection, and Putting to Work of a NEW TWO-LIFT SPIRAL GUIDED HOLDER of similar capacity in existing Brick Tank at the Blandfield Storage Station, Broughton Road, Edinburgh.

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Tenders to be lodged with the undersigned on or before 10 a.m. on Monday, 4th September, 1933, endorsed "Tender for Gasholder."

The Magistrates and Council do not bind themselves to accept the lowest or any Offer.

A. GRIERSON, S.S.C.,
Town Clerk.

City Chambers,
Edinburgh,
Aug. 22, 1933.

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Town Clerk.

Richmond,
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August, 1933.

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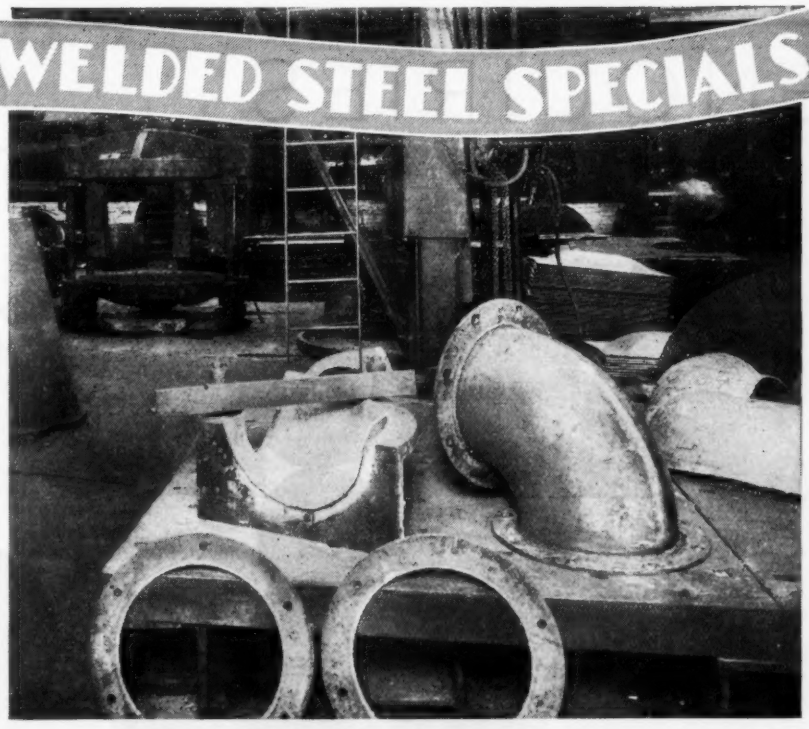
(See page 23 of Brochure No. 8).



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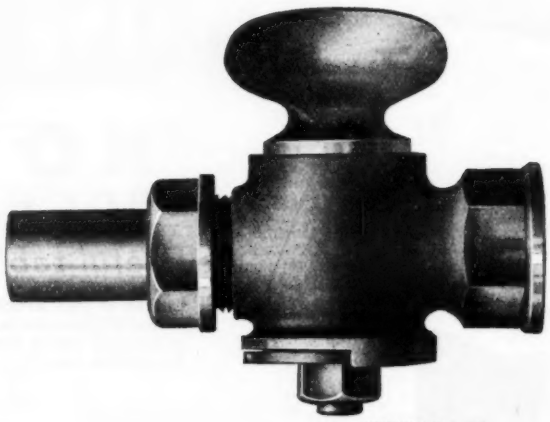

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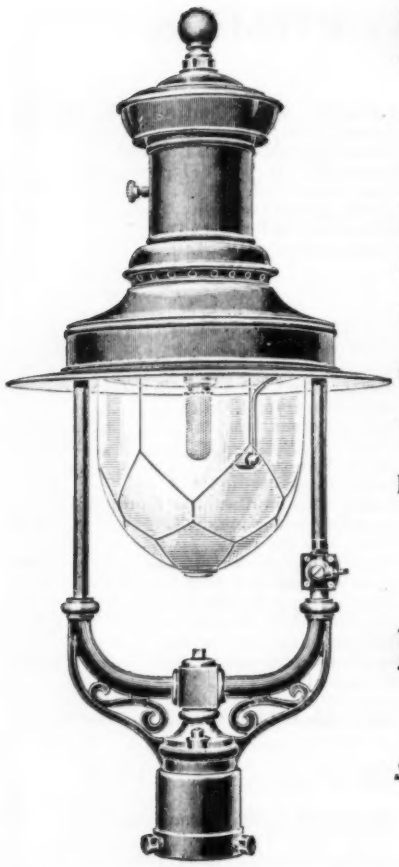

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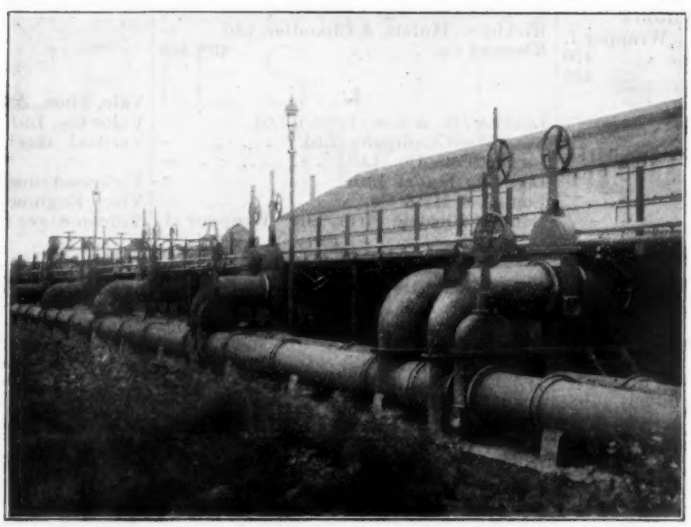

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